THE IMPACT OF HOUSING COSTS ON HOUSEHOLD INCOME ACROSS PRIMARY AND SECONDARY AREAS IN SOUTH AFRICA

By Evashnie Govender

Thesis presented in partial fulfilment of the requirements for the degree MPhil Urban and Regional Science in the Faculty of Arts at Stellenbosch University

Supervisor: Herman Geyer Jr

March 2020

AUTHOR'S DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification

Date: March 2020

ABSTRACT

South Africa is a country faced with considerable discrepancies in housing costs, property values and income distribution across various geographical areas. Housing is the largest expenditure component in the Consumer Price Index (CPI), the CPI not only measures the changes in price levels of goods and services but also tracks the inflation rate of the country. The importance of housing in the CPI indicates that South Africans pay more on housing than any other expenditure incurred which means that citizens sacrifice their spending on essential living needs and not afforded the ability to save adequately. This research examines housing costs and household income of South Africans across the various primary and secondary areas in the country in order to provide theories to the area of study by drawing conclusions from the data presented and to help policymakers and users to plan, draw up policies and aid in decision making.

Regression analysis is applied to analyse the effect of variables such as age, sex, income and location on housing costs. The average income earned by males is higher than females with males spending more on housing than females. At quintile level of analysis on income and housing costs, results show that women in lower quintiles pay more on housing than men. As the age of the head of a household increases, the share of income spent on housing decreases with age. The rental importance by dwelling type revealed that houses are the most dominant dwelling type for South African's as more people choose to live in houses compared to flats and townhouses even though townhouses are in high demand, particularly in the metropolitan areas of the country. Demand and supply of housing is a major contributor to rental inflation, and higher inflation rates were predominantly present in areas where supply could not meet demand, pushing up housing prices and placing pressure on households in terms of affordability. The research found that income holds a strong statistically significant negative relationship with a small variance indicating that as income increases the share of income spent on housing decreases.

Keywords and phrases: Owner's equivalent rent (OER); actual rentals; Consumer Price Index (CPI); housing costs; house prices; property costs; rental inflation; primary and secondary areas; affordability; household income; dwelling type; migration; internal migration, migrants, assessment rates, sectional title levies.

OPSOMMING

Suid-Afrika is 'n land met groot verskille in behuisingskoste, eiendomswaardes en inkomsteverspreiding oor verskillende geografiese gebiede heen. Behuising is die grootste uitgawekomponent in die Verbruikersprysindeks (VPI); die VPI meet nie net die veranderinge in prysvlakke van goedere en dienste nie, maar meet ook die inflasiekoers van die land. Die belangrikheid van behuising in die VPI dui daarop dat Suid-Afrikaners meer aan behuising spandeer as enige ander uitgawes wat aangegaan word, wat beteken dat landsburgers hul uitgawes op noodsaaklike items spandeer en nie die vermoë het om voldoende te spaar nie. Hierdie navorsing het ten doel om behuisingskoste en huishoudelike inkomste van Suid-Afrikaners in die verskillende primêre en sekondêre gebiede in die land te ondersoek, om teorieë aan die studieveld te voorsien deur gevolgtrekkings te maak uit die data wat aangebied is en om beleidmakers en gebruikers te help om te beplan en hulp te verleen aan besluitneming.

Regressie-analise word toegepas om die effek van veranderlikes soos ouderdom, geslag, inkomste en ligging op behuisingskoste te ontleed. Die gemiddelde inkomste verdien deur mans is hoër as vroue, met mans wat meer spandeer op behuising as vrouens. Op kwintielvlak van die ontleding van inkomste en behuisingskoste, toon die resultate dat vroue in die laer kwintiele meer aan behuising betaal as mans. Namate die ouderdom van die hoof van 'n huishouding toeneem, neem die gedeelte van die inkomste wat aan behuising bestee word af met ouderdom. Die annalise van huurwaarde volgens tipe woning het aan die lig gebring dat huise die oorheersende behuisings tipe vir Suid-Afrikaners is, omdat meer mense verkies om in huise te woon in vergelyking met woonstelle en meenthuise, hoewel daar 'n groot aanvraag is na meenthuise, veral in die metropolitaanse gebiede van die land. Die vraag na en aanbod van behuising lewer 'n groot bydrae tot huurinflasie en hoër inflasie koerse was oorwegend aanwesig in gebiede waar die aanbod nie aan die vraag kon voldoen nie, wat huispryse verhoog en huishoudings onder druk plaas ten opsigte van bekostigbaarheid.

Uit die navorsing is bevind dat inkomste 'n sterk statisties beduidend negatiewe verwantskap het met 'n klein afwyking, wat daarop dui dat namate die inkomste toeneem, die deel van die inkomste wat aan behuising bestee word, afneem.

Trefwoorde en frases: Beraamde waarde van eienaarbewoonde huise (BWEH); werklike huur; Verbruikersprysindeks (VPI); behuisingskoste; huispryse; eiendomskoste; huurinflasie; primêre en sekondêre gebiede; bekostigbaarheid; huishoudelike inkomste; woning tipe; migrasie; interne migrasie, migrante; eiendomsbelasting; deeltitel heffings.

ACKNOWLEDGEMENTS

Finally, this thesis has become a reality, and I owe my gratitude to the following who have made this possible.

Mr Herman Geyer, my supervisor who let me approach this paper at my own pace while offering his expert guidance and knowledge throughout the way. Thank you for having faith in this paper from the onset.

Statistics South Africa under the leadership of the Statistician-General Mr Risenga Maluleke, who has given me this blessed opportunity to study at the prestigious University of Stellenbosch. A government organisation that I am proud to say I am a part of, committed to exceeding excellence in delivering statistical publications of the highest quality to its users.

Mr Werner Ruch and Mrs Marietjie Bennett, who assisted me data requirements ever so efficiently and timeously. Mr Ruch, who consistently tried to acquire and merge the data to meet the needs of this paper.

Mr Krelin Naidoo, your support is unmeasurable. Without your statistical support, this paper would not have been possible. You are a genius, and I am blessed to have you as a friend.

My friends and family who have been with me this year, encouraged, advised, motivated and believed in me. Your unwavering support was outstanding thank you.

Lastly, Pikachu, my dear cat who sat with me during the long hours and late nights while I worked on this paper and who unfortunately passed away a few days before it was due. Thank you for being with me every step of this journey through your pain and illness.

CONTENTS

AUTHOR'S DECLARATION ii
ABSTRACT iii
OPSOMMING iv
ACKNOWLEDGEMENTS v
Contents vi
Tables viii
Figures ix
ABBREVIATIONS AND ACRONYMS xi
CHAPTER 1: INTRODUCTION 1
1. INTRODUCTION 1
1.1 Background and problem statement 1
1.2 Research questions 2
1.3 Aims and objectives 2
Chapter 2: LITERATURE REVIEW 4
2. LITERATURE SURVEY 4
2.1 Housing, housing costs and the economy 4
2.2 Housing affordability and housing costs 5
2.3 Demand and supply of housing on housing costs 6
2.4 Consumer spending, expected income and housing costs 6
2.5 Wealth and housing costs 7
2.6 A South African context 7
2.7 Migration and house prices 10
2.8 The choice to own or rent and dweller satisfaction 12
2.9 Owners' equivalent rent in the calculation of rental inflation (housing costs) 15
CHAPTER 3: METHODOLOGICAL DESIGN 19
3. METHODOLOGY 19
3.1 Methodology introduction 19
3.2 Primary and secondary areas selection and classification 19
3.3 Housing sample 20
3.4 Aggregation of data and calculation of indices 21
3.5 Deriving results and interpreting findings 22
3.6 Data sources 23
CHAPTER 4: EMPIRICAL ANALYSIS 25
4. EMPIRICAL FINDINGS 25

4.1 Introduction 25
4.2 The importance of rental in South Africa based by dwelling type 25
4.3 The comparison of actual rentals and OER across primary and secondary areas 31
4.4 Housing costs, assessment rates and sectional title levies 41
4.5 The supply of housing in South Africa 45
4.6 Core analysis 47
CHAPTER 5: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS 55
5. CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS 55
5.1 Introduction 55
5.2 Summary and conclusions 55
5.3 Limitations of the study 56
5.4 Recommendations 57
6. REFERENCES 58
7. APPENDIX 62

TABLES

Table 1.1 Primary and secondary area sample selection…… 20

Table 1.2 Housing weights in the 2019 CPI…….22

Table 1.3 Settlement structures in Polokwane…….26

Table 1.4 Correlation coefficients of primary areas…….42

Table 1.5 Correlation coefficients of secondary areas…….42

Table 1.6 Correlation relationship between primary and secondary areas……...42

Table 1.7 Average housing cost paid by sex.....52

Table 1.8 Regression results…….....53

FIGURES

Figure 1.1 Factors affecting the affordability of housing……..…6

Figure 1.2 Percentage of household income by population group 2014/2015……..…..8

Figure 1.3 Household income and expenditure by province 2014/2015……...10

Figure 1.4 Ownership status of households living in formal dwellings……14

Figure 1.5 Reasons for selling residential property……15

Figure 1.6 Headline CPI, actual rentals and OER inflation……..……17

Figure 1.7 Rental weight of houses in primary areas……..……26

Figure 1.8 Rental weight of houses in secondary areas……..……27

Figure 1.9 Rental weight of townhouses in primary areas……..……28

Figure 1.10 Rental weight of townhouses in secondary areas……...…28

Figure 1.11 Rental weight of flats in primary areas……..…..……29

Figure 1.12 Rental weight of flats in secondary areas……30

Figure 1.13 OER versus actual rentals Cape Peninsula……33

Figure 1.14 OER versus actual rentals Port Elizabeth ……..33

Figure 1.15 OER versus actual rentals East London……33

Figure 1.16 OER versus actual rentals Kimberly……34

Figure 1.17 OER versus actual rentals Bloemfontein and Welkom……34

Figure 1.18 OER versus actual rentals Durban and Pinetown……...34

Figure 1.19 OER versus actual rentals Pietermaritzburg……..…35

Figure 1.20 OER versus actual rentals Rustenburg ……..35

Figure 1.21 OER versus actual rentals Tshwane……..…35

Figure 1.22 OER versus actual rentals Johannesburg……..36

Figure 1.23 OER versus actual rentals Ekhurleni……36

Figure 1.24 OER versus actual rentals Nelspruit and Witbank..……36

Figure 1.25 OER versus actual rentals in Polokwane.……...37

Figure 1.26 OER versus actual rentals George, Paarl and Worcester……..…38

Figure 1.27 OER versus actual rentals De Aar and Kuruman.……..39

Figure 1.28 OER versus actual rentals Newcastle, Stanger, Ladysmith and Empangeni..…39

Figure 1.29 OER versus actual rentals Bethlehem and Kroonstad.……...39

Figure 1.30 OER versus actual rentals Mafikeng, Brits and Potchefstroom.…….40

Figure 1.31 OER versus actual rentals Krugersdorp, Vereeniging and Vanderbiljpark ……40

Figure 1.32 OER versus actual rentals Ermelo and Secunda ……40

Figure 1.33 OER versus actual rentals Tzaneen and Phalaborwa……..41

Figure 1.34 Housing cost and assessment rates scatter plot……..…….44

Figure 1.35 Housing supply per metropolitan area by the number of units completed....46

Figure 1.36 Housing supply per metropolitan area by Rand value completed……..……46

Figure 1.37 Relationship between the log of income and housing cost at aggregate level……..……47

Figure 1.38 Relationship between the log of income and housing cost by primary and secondary area……..……48

Figure 1.39 Relationship of the share of income spent on housing at an aggregate level……..……49

Figure 1.40 Relationship of the share of income spent on housing by primary and secondary area……..49

Figure 1.41 Relationship between the age of head and housing costs at aggregate level……..50

Figure 1.42 Relationship between the age of head and housing costs by primary and secondary area…..……51

Figure 1.43 Average housing cost by sex……..……54

ABBREVIATIONS AND ACRONYMS

CBO	Community Based Organisation
COICOP	Classification of Individual Consumption by Purpose
CPI	Consumer Price Index
GDP	Gross Domestic Product
GHS	General Household Survey
IES	Income and Expenditure Survey
LCS	Living Conditions Survey
MLR	Multiple Linear Regression
OER	Owners' Equivalent Rent
PCE	Personal Consumption Expenditure
Stats SA	Statistics South Africa
Metro/s	Metropolitan Area
UK	United Kingdom
US	United States

CHAPTER 1: INTRODUCTION

1. INTRODUCTION

This section of the paper will introduce the content of the study by firstly giving a background to the area of study incorporating the problem statement. The background indicates how housing costs are measured in South Africa, introducing the South African Consumer Price Index (CPI) followed by the research questions and the aims and objectives of the paper follows.

1.1 Background and problem statement

The global recession in the recent past caused an increasing interest in the macro-economy, and the housing market as changes in this environment affect the functioning of the housing sector. Since the 1970's the relative price of housing, its expenditure share and unaffordability have all grown. South Africa has seen considerable discrepancies in housing costs, property values and income distribution across different areas of the country. With more and more disposable income of households being eaten away by housing and property costs, citizens are sacrificing their spending on meeting essential living needs and are unable to save adequately.

Along with the discrepancies mentioned above, another challenge faced is the supply of housing. The South African constitution under Act 108 of 1996 guarantees the right to access adequate housing for all citizens and Section 26(2) establishes that the government must take reasonable legislative measures within its available resources to realise this right, (Dugard et al 2016). The supply of housing, however, been a challenge for the government as it is unable to keep up with the population increases and the demand for housing in urban areas. Domestic or provincial migration in South Africa is a significant force that is driving urbanisation by increasing the demand of housing in urban areas and at the same time placing considerable pressure on the respective provinces to meet housing demands. The implementation of various policies took place to resolve the housing backlog, currently at approximately 2.1 million units, yet success in achieving the long term goal of providing adequate housing for all has remained a challenge.

South Africa uses the monthly Consumer Price Index published by Statistics South Africa to measure the cost of housing and changes in the general price level of goods and services. The changes in price levels of these goods and services are the basis used to calculate the inflation rate of the country, which is then used by the government and other institutions in its decision-making processes. The price of housing services is vital to calculate the CPI for housing in a meaningful way (Beatty et al 2010), as housing costs more especially in the South African CPI is the largest weighted component in the household basket of goods and services, and therefore any significant changes to this index will have a high impact on the overall inflation rate of the country. By housing having the weighted component,

means that housing is what South Africans spend most of their income on when compared to any other expenditure item, including food. In other countries, this may not hold the same as other consumer expenditure items may have a higher weight than housing in their consumer basket of goods and services.

Housing costs and the impact which these costs have across the selected primary and secondary areas in South Africa will be the main focus of this study. Housing costs are evaluated in terms of how it erodes household income across these selected areas. Primary and secondary areas refer to the larger cities and towns in each province. Municipal boundaries, as applicable in the 2001 census was used to define the demarcation boundaries of each primary area such as the City of Cape Town, eThekwini and the City of Johannesburg (Stats SA 2009). Secondary areas are defined by the continuous built-up area known by that name rather than municipal boundaries, which in many cases include substantial rural areas (Stats SA 2009).

The erosion of household income by housing costs is a reality as and is reiterated by the importance of the weight as explained above attached to the housing component in the South African CPI. Due to housing having the highest weight as part of consumer spending indicates how South Africans indeed spend a large part of their income on housing. This significant expenditure incurred is a problem for the future growth of the people and a nation as a whole. For purposes of this study, housing costs refer to rental expenditure, which translates into rental inflation.

1.2 Research questions

- How do housing costs differ across primary and secondary areas?
- What is the relationship between housing costs and income in primary and secondary areas?
- Does housing costs by dwelling type differ between areas, and if so, why?
- Is there any correlation between housing costs and sectional title levies and between housing costs and assessment rates in the selected areas?
- Which areas are leaders in spatial development in terms of supply of housing?

1.3 Aims and objectives

The main aim of the study is to analyse housing cost across the primary and secondary areas of South Africa, as well as household income in these areas to identify how housing costs and household income differs in the selected areas and what are the causes of these differentials. The analysis uses CPI time series data together with data from the Living Conditions Survey (LCS) 2014/2015 to derive and interpret findings. The secondary aim is to interpret patterns when analysing variables within the theoretical framework by examining all aspect related to housing in the CPI.

The objectives to be achieved in the study is to determine rental importance by dwelling type be it flats, townhouses and houses in both primary and secondary areas of the country; to develop a rental inflation index for actual rentals and owners' equivalent rent (OER) in the primary and secondary areas selected ensuring that the correct methodology is applied, determine how the former rental expenditure calculated differs across various primary and secondary areas and reasons causing these differences; establishing if a correlation exists between housing costs and assessment rates and housing costs and sectional title levies; examination of the supply of housing in South Africa to determine to identify which metros are providing what type of dwelling structure, in this way spatial development patterns are determined which indicates which provinces are leading in terms of development as a city and a province at a whole; analyse and interpret the results from the research and provide theories to the area of study by drawing conclusions from the data presented to help policymakers and users to plan, draw up policies and aid in decision making.

The research hypothesises that there is an inverse or negative correlation between housing costs (independent variable) and household income (dependent variable), as property costs increase, disposable household income decreases. Additionally, the hypothesis expects that the underlying reason for increases housing costs and high rental inflation is a lack of supply of housing to meet the growing demand.

CHAPTER 2: LITERATURE REVIEW

2. LITERATURE SURVEY

This section of the paper reviews the existing literature and consequently aligns the literature to a South African context by looking at housing costs and the economy in general, after that focusing on the South African housing market. The examination of the concepts affordability, consumer spending, wealth and income to housing costs follows paying attention to the factors affecting affordability. The study looks at how South Africans spend their income overall, spending by population group and spending by province. A discussion on migration issues follows with particular attention to immigration and the effect of migration on house prices. The selection criteria for primary and secondary areas follows as these areas form the basis of the study area for this research. The literature then evaluates the criteria that households or individuals use when opting to rent or buy a property followed by a discussion on owners' equivalent rent as to its importance in the calculation of rental inflation in the Consumer Price Index.

2.1 Housing, housing costs and the economy

From 1959 to 2014 the United States (US) experienced a decline in household spending on food and clothing while expenditures for utilities and housing costs were escalating with increases being more prevalent amongst the renting households and most severe along coastal areas and large cities (Albouy et al 2016). Food, clothing and housing are often termed a basic necessity; however, with the rising share of expenditure on housing and housing costs, this contradicts the view of housing as a necessity. According to (Albouy et al 2016), the increasing expenditure share on housing and housing costs should have been on a decrease as the average income of households increased over time.

Economists believe that movements in the housing markets are not only affected by economic consequences but provide vital signals in business cycle fluctuations (Iacoviello 2009). It is, therefore, safe to say that housing is not confined only to the topic of real estate economics but economics as a whole. Spillover effects arise from the housing sector economy into the real sector of the economy due to household consumption being the most significant component of the Gross Domestic Product (GDP) and expenditure on housing being the highest expenditure item in the CPI. With this importance of housing, it does not come as a surprise that most recent literature in South Africa on house prices shows a strong positive influence of house prices on consumption and economic growth (Preez et al 2016).

House price bubbles refer to as an increase in prices beyond a required sustainable level and a study undertaken by (Das et al 2011), tests for these house price bubbles in the South African housing market. The findings from the study revealed that there were bubbles in the large, medium, and small segments of the housing market. The categorisation used for the segments in housing were; houses based on size

with the large segment between (221 m2 and 400 m2), the medium segment between (141 m2 and 220 m2) and small segment from (from 80 m2 to 140 m2). The bubbles identified in the housing market should be of concern to government and monetary financial institutions as this will indicate further bubbles in consumption expenditure. The question, therefore raised, is whether the South African Reserve Bank should target house price inflation as both the prices of goods and services and prices of rental (housing costs) are both sticky in that a price of a good or service does not immediately change to a new market price when there are shifts in demand and supply. An optimal weight should, therefore, be placed on rental inflation or housing costs in proportion to its share in the total housing expenditure (Jeske & Liu 2013). The findings of Jeske & Liu (2013), found that for the most appropriate monetary policy, the weight of rental inflation should be lower than what it is presently.

Currently, in South Africa, Lightstone Property provides housing price indices where data is sourced from the Surveyor General and the registry of the Deeds Office with a House Price Index report being generated on a monthly basis. The CPI, on the other hand, provides the housing cost component of expenditure whereby rental inflation is tracked.

2.2 Housing affordability and housing costs

Housing affordability is vital in determining if a household should rent or buy a property. The consideration is that housing is affordable only if no more than 30% of a household's income is spent on housing costs (Baranoff 2016.) Similarly, the Victorian Council for Social Sciences in Australia measures housing stress, where households falling in the lowest 40% of disposable income pay more than 30% of that income on housing (Dzangmah 2012). The study of (Baranoff 2016), found that approximately 40% of households in San Francisco spend more than 30% of their income on housing costs, placing the city in a housing affordability crises. With housing costs consuming the majority of household income, the city finds itself with a growing rate of income inequality. Individuals at the bottom end of income distribution often find that their share of income spent on housing as a necessity good is further amplified by declining income (Dustmann et al 2018). Housing supply, together with affordability plays a huge role in producing differences in both housing and labour markets across various areas. Housing affordability has effects on the local labour market whereby an enterprise in a given area is unable to expand without a lack of affordably priced homes to house new workers (Baranoff 2016). A cost-to-income ratio is a direct measurement of actual costs of household relative to their actual income and comprises of only two inputs, namely; housing cost and income (Dzangmah 2012). This ratio is, although very straightforward, affects affordability by various other underlying demand and supply factors indicated in Figure 1.1. Income plays a pivotal role as a primary determinant in deeming if housing is affordable as well as affecting housing prices in the market.

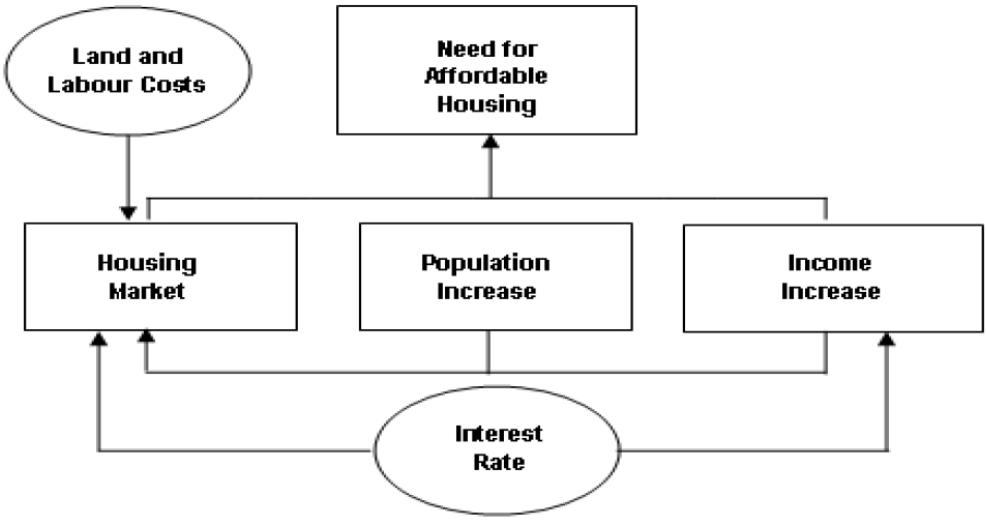

Figure 1.1 Factors affecting the affordability of housing

Source: Dzangmah (2012)

2.3 Demand and supply of housing on housing costs

Seeing that housing is regarded as a normal good, the expectation is that as income increases, so too will the demand for housing, thus increasing the average price of housing. Another important determinant for the demand for housing is demography; population growth increases the demand for housing, causing a further increase in housing prices. Increased demand accompanies increased incentive for property developers to increase supply. If the construction capacity is enough and meets the growing population needs, then ultimately, there should be a limited impact on housing prices. Developer's costs have a considerable impact on housing affordability in that the land has to be sourced and purchased, and construction workers have to be paid a salary. With all these costs in mind, new housing developments will aim to capture most of the demand market, offering housing above a certain minimum price level (Dzangmah 2012). Low-income earners are thereby affected by the minimum price levels set by housing developers, especially if their salaries may have fallen, or have experienced only marginal increases in salary. Demand and supply are affected by changes in interest rates. Should there be a drop in interest rates; developers benefit from financing their business at a cheaper rate, making housing development more affordable. Further, this drop in interest rates means more money for households to spend comfortably on housing.

2.4 Consumer spending, expected income and housing costs

So what effect does spending have on house prices? Various factors affect consumer spending patterns and house prices including, a decrease in interest rates, an increase in credit expansion facilities and an improvement in income expectation. A decrease in interest rates makes the affordability of housing

more attractive, raising the demand for housing and making the property market more competitive. Again with more credit being available, affordability increases, increasing the demand for housing and pushing up house prices. All these factors contribute to increased demand for consumer goods and services with housing being the dominant expense item of a household's budget. With the increase in housing demand, household spending increases along with housing prices. In all these cases (Benito et al 2006), states that there could be a direct relationship to higher house price inflation and higher consumer spending.

Expected income is a crucial common factor whereby should one expect an increase in household income; this expectation leads to planning for higher spending currently and in the future. The study of Benito et al. (2006), found that the importance of income expectations shows that house price movements and housing costs are more closely related to younger earning households as younger households have more years of employment ahead and generally expect to benefit from a general rise in salaries in the future. The study found that in the late 1980s spending by younger households moved more closely with rising housing prices and in the early 1990s moved closer with declining housing prices.

2.5 Wealth and housing costs

Consumer spending, wealth and house prices are concepts that are closely related. The value of a household's total wealth is affected by house prices. Further, a house has a dual role in that it is a consumption good as well as an investment; it delivers a service stream and provides returns and capital gains or losses (Beatty et al 2010). Consumption or household spending is pushed up by higher house prices increasing housing wealth of households who own property. A supposition is that because housing is a huge part of the wealth of a household, house prices, therefore, influence consumer spending (Benito et al 2006). Housing for many households translates as their most valuable assets owned with more people owning homes as investments rather than investing in shares (Banks & Smith 2000). According to (Rapach & Strauss 2006), consumption responds more strongly to housing wealth fluctuations rather than in stock market-based wealth; therefore, variations in house prices constitute a significant fraction in the change on consumer spending. However, (Aoki et al 2001) states in reality aggregate wealth and house prices are not enough to explain the historical trends between consumer spending and house prices.

2.6 A South African context

2.6.1 South African income and expenditure overall

An average South African household size comprises of three-point three persons with an average annual income of R138 168 and an average annual expenditure of R103 293 (Stats SA 2017b, p. 13). The

majority of South Africans household income is spent on housing and utilities (32.6%), followed by transport (16.3%), miscellaneous goods and services (14.7%) and food at (12.9%) (Stats SA 2017b, p.3). These consumer expenditures are consistent with the theory that housing is the largest component of household expenditure. Based on South African households income and expenditure, as the percentage of the income of a household increases, the household budget on housing costs increases while the inverse is true for food. Contrary to (Albouy et al), who states that as income increases, the cost of housing should be on a decrease.

2.6.2 Income distribution by South African population group

With South Africa being a racially diversified country, one has to understand the dynamics of the distribution of income over different races. From 1924/25 to 1960, over a 35-year period, there has been a relative consistency in the distribution of income by race with white-headed households earning much more than other race groups. However, between 1970, there was a sharp increase in black income share from 22% to 38% (Spandau 1971, p.9). Figure 1.2 shows the differences in the annual average household income by population group. The average income earned per annum is highest amongst white-headed households at R444 446 (45,27%), followed by R271 621 (27,67%) by Indian/Asian headed households, coloureds at R172 765 (17,60%) and finally the Black African households earning an average of R92 983 (9,47%) (Stats SA 2017b, p.14).

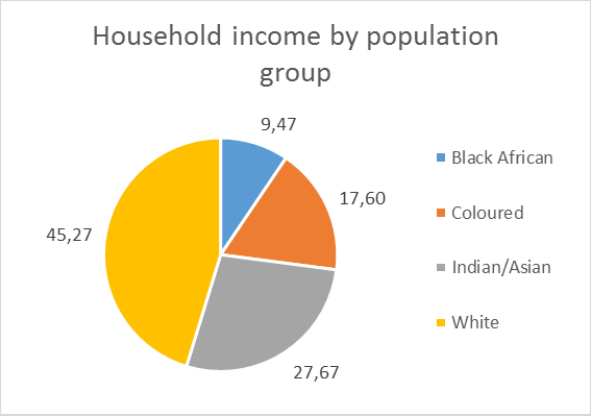

Figure 1.2 Percentage of household income by population group 2014/2015

Source: Statistics South Africa (2017b)

South Africans primary sources of income include income from work; income from capital; pensions, social insurance and family allowances; income from individuals; imputed rent on owned dwellings and other income (Stats SA 2017b, p.14). White households receive 19.2% of their household income from imputed rent on owned dwellings, and in comparison with the other race, groups received the

lowest percentage in terms of revenue from work (Stats SA 2017b, p.14). The assumption is that white households invest much more of their income in property and have adopted the approach of income diversification. Income diversification is the phenomenon where an individual increases the number of sources of income for the provision and maintenance of a sufficient livelihood. The aim is to reduce risk in times of destitution by having access to two or more sources of income. This diversified approach will enable the household to increase their livelihood and living standards (Mathebula et al 2017). Unequal distribution of property income places upward pressure on inequality as the share rises, and should property income be the only source of income for a household, then this would undoubtedly contribute to overall inequality (Van Der Berg 2010). Table A.1 in Appendix A shows in more detail the different sources of income by population group, which ultimately translates as to how population groups diversify their household income.

2.6.3 Income distribution by provincial level

To gain a better understanding of the distribution of household income of South Africans, income will be explored at a provincial level in the literature to provide a background and overview, and during the analysis stage, as the primary outcome of the study, household income will be analysed at primary and secondary area level. Figure 1.3 shows the average annual household income by province, average annual household expenditure by province, percentage of rental income received by province and the percentage of rental income paid to total household income. The data used was collected over the period from 13 October 2014 to 25 October 2015 and is the most recent data currently available. The South African province with the lowest average annual household income was Limpopo at R79 152, followed by the North West at R86 926 while the Western Cape had the highest average annual household income of R222 959 followed by Gauteng with a figure of R193 771 making them the only two provinces whose average annual household income was higher than the average national income at R138 168 (Stats SA 2017b, p.16). These two provinces are not only the provinces with the highest average income but also have the highest average expenditure.

The Western Cape and Gauteng both spend about 19,74% of their incomes on rentals followed by Limpopo and the Eastern Cape with expenditure on rentals at approximately 17% (Stats SA 2017b, p.16). The province with the lowest spending on rentals is the Northern Cape. The Northern Cape Province shows low expenditures on rentals purely because of its spatial makeup. Although the province has the largest amount of land space, it has the smallest population numbers. As mentioned in the literature, housing is considered affordable only if no more than 30% of a household's income is spent on housing costs (Baranoff 2016). With all provinces housing costs averaging below 30%, the study cannot for certain deduce that housing is unaffordable in South Africa as we area analysing provincial data in totality. To make a more realistic assumption, one would have to look in more detail such as

individual household level or down to primary or secondary area level to get a clearer picture on affordability. It is, however, safe to say we are not in a housing crisis as in the case of San Francisco.

When looking at owner-occupied rental income, the average annual imputed rental from owner occupied dwellings was the largest from Western Cape at R33 818 followed by Gauteng at R30 526 with the Free State having the lowest annual average income from imputed rentals at R 8 874 (Stats SA 2017b, p.16). An assumption can be made is that the property in Western Cape and Gauteng are relatively more expensive than those in other provinces; therefore, the owner's equivalent cost of is higher in these provinces.

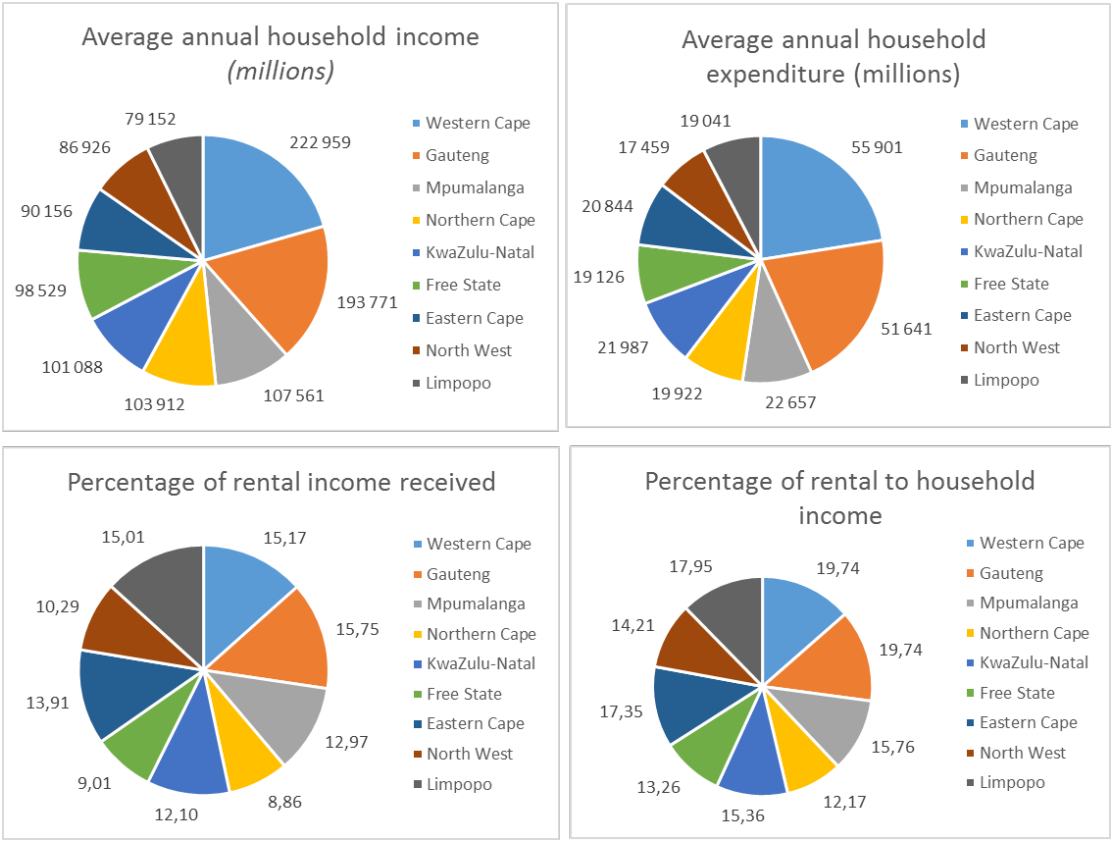

Figure 1.3 Household income and expenditure by province 2014/2015

Source: Statistics South Africa (2017b)

2.7 Migration and house prices

The distribution of economic activities spatially has important implications in terms of performance in a given economy, as well as an individual's welfare and aids to understand the provincial migration patterns that occur. The clustering of economic activities in certain regions may not pose a problem if lagging regions undertake measures of catching up in terms of performance; however, persistent inequalities spatially in economic activities result in disparities in welfare outcomes (David et al 2018). The spatial inequalities can occur, for example, when firms cluster together in a region. This clustering

provides significant benefits to the firms and places them in an advantageous position in terms of reduced transport and freight costs, increased profits and additional agglomeration. The clustering of economic activities is a pull factor attracting migrants to the provinces pushing up the demand for housing and ultimately increasing the prices of housing.

While some authors predict house prices fall due to immigration, others suggest the opposite. The demand for housing and rental accommodation increases due to immigration and also affect service delivery, amenities and perceived desirability of the neighbourhood (Accetturo et al. 2014). In small local housing markets, immigration raises the demand for property which increases house prices. There is an alternative, however whereby house prices may fall due to out-migration of residents. The underlying reason for the decline in house prices is that house prices grow at a slower pace due to the area being deemed less desirable.

In the study by (Larkin et al 2018), the conclusions were that increased immigration in different countries increased house prices; however, the effect varied according to different regions over time. Out-migration due to immigration resulted in a decline in the neighbourhood with a reduced willingness for buyers to pay higher prices for housing. Usually, people like living next to people they feel comfortable with and near their kin which drives the house price selection for housing destinations.

Although most studies on migration focus on international migration or immigration, the majority of migration in South Africa occurs within its borders. Domestic migration or provincial migration also referred to as internal migration, is where South Africans move from one province to another. This type of migration is a significant force that drives urbanisation all over the world. The impact of domestic migration inflows on local house prices depends on both the magnitude and structure of migration flows and the elasticity of the supply of housing across local housing markets (Mare & Stillman 2008). The inflow of migrants varies across areas with different groups of migrants demanding different types of housing, different quantities at different tenure types. The impact of migration flows over time into a specific area affects other local areas. This occurrence is due to population shares and relative house prices adjusted to restore a spatial equilibrium in which people are once again indifferent about which area they locate to (Mare & Stillman 2008).

The study of (Reed 2013), found that those who had previously moved towns or cities at least once are significantly more likely to move again. This mobility thus creates a demand for housing, and with a lack of supply to meet the market demand comes into effect rising costs of housing. Supply elasticities, according to (Glaeser et al 2005) varies across different areas. The costs of construction, increasing-price of land and governing barriers to new construction cause shifts in demand which affect house price inflation. In the case of San Francisco, the increasing population growth and demand for housing were unmet with the increase in supply making the city further unequal in terms of income, pushing housing prices even higher (Baranoff 2016). In New Zealand, the migration of local residents resulted

in high levels of population growth. Accordingly, there was a rapid appreciation of house prices (Mare & Stillman 2008). A population increase of one per cent in a local area correlates to higher property sale and rental prices at (0,2%) and (0,5%) respectively.

In South African, Gauteng and the Western Cape have seen the most significant migration inflows approximately 1 643 590 and 493 621, respectively (Stats SA 2019a, p. 15). This migration places considerable pressure on the respective provinces to meet housing demands. In terms of supply of housing, when the supply of housing is price elastic, house prices will be low however should supply be inelastic, a market response reflection presents itself in rental or house price increases (Nygaard 2011). Although migration generates significant economic benefits, the increased levels of migration produce a negative effect on wages and salaries, placing pressure on scarce resources and increases housing prices (Nygaard 2011).

Housing market dynamics depends a lot on the housing systems in place to accommodate the growing migration from province to province and well as international migration into provinces. International studies identified a strong correlation between the levels in house prices and the existence of immigrants. The study of (Nygaard 2011), found that where there were high levels of net migration, there was a quick increase in house prices, however, the rental increase was more gradual. What this suggests is that owner-occupation housing supply was inadequate to improve the pressure of housing prices from demand and that the supply of properties in the private rental market grew rapidly enough to moderate rental increases. It is important to note that changes in house prices are not only due to migration, but various other factors can influence the change namely; interest rates, changes in the levels of income or the ability to obtain a mortgage loan from a financial institution.

2.8 The choice to own or rent and dweller satisfaction

There are various factors that a household takes into account when choosing to locate to a particular area as discussed under domestic migration, amongst those another essential component is dweller satisfaction, in other words, quality of life. Further, in the study, we will examine the location and the effect that location has on housing costs. As an occupant of a dwelling, satisfaction depends on nine variables which include washing amenities, sanitary amenities, cooking amenities, dwelling size, air and ventilation, living rooms, the issue of noise, waste and refuse disposal and overall cleanliness of the neighbourhood (Soen 1979). Satisfaction is an essential component as it is one of the underlying reasons that occupants choose to relocate. Dissatisfaction could stem from several reasons, when looking at the overall neighbourhood, if the surroundings are dilapidated and unsafe, the resulting problem will be neighbourhood decline. Neighbourhood decline accompanies a fall in property prices in that specific area, and falling property prices results in cheaper or lower rentals. Lower rentals would likely correlate with the income levels within the neighbourhood, seeing as a wealthy household would

not necessarily choose to live in a dilapidated declining area. Therefore the occupant's satisfaction with the dwelling or the area will the importance of needs are then from the highest need to most basic need as seen below (Soen 1979). When the most basic needs are satisfied, then only do we move up to satisfy the highest needs.

Highest need

Aesthetics of neighbourhood and house
Need to socialise and express oneself socially
Need for convenience and comfort
Need for security
Need for shelter

Most basic need

According to (Benito et al 2006), there are different theories which have implications for the behaviour of those who rent and those who own their property. On the one hand, higher-income expectation affects both renters and homeowners, and therefore, spending by both groups increase with house prices. On the other hand, savings as a precaution and collateral should only affect homeowners. A closer relationship is implied between spending by homeowners compared to spending by renters (Benito et al 2006). Occupants have basic needs which have to be fulfilled and depends on the stage of the lifecycle that he or she finds himself in and the lifestyle of the occupant (Soen 1979). Four stages within a life cycle occur when an occupant plans for needs identified by (Beyer 1949).

a) Young couple stage with no children
b) Founding family whereby a couple has children eight years and younger
c) A family that is growing with parents and children between the ages of eight and eighteen
d) A family that is contracting with ageing parents and in some cases children over the age of eighteen

The age group that an occupant finds himself provides an essential motivation on the choice to buy or rent. Young adults are usually the age group likely to rent due to the flexibility that the rental market offers, lower transaction costs and a natural choice being a student or having the ability to change jobs, this flexibility that renting accompanies is ideal. The result is almost four out of five young adults under the age of 25, two-thirds of adults between the age of 25-29 and more than half of the households within their early 30s opt for rental rather than buying (Harvard University 2013). The transition from renting to owning and owning to renting is typically a result of an employment change or a change in marital status. Often a change is undertaken as housing costs is lower when choosing to rent rather than buying. Choices on location and the dwelling type depend on the household type or need. Young households

with no children are more likely to live in multifamily housing in major town and cities, and as these households progress by moving into the stage of childbearing phase, single-family homes are the preference in suburban areas (Harvard University 2017). In central towns, land prices are higher, and there is a higher concentration of low-income households, here renting is prevalent.

Table A.2 in Appendix A is based on the 2016 General Household Survey (GHS) and shows tenure type based on the age of household head, sex, location of the dwelling, income category of household, and if the household comprised of children under the age of 18. Results revealed that female-headed households choose to rent more rather than purchasing a property. As the age category increases, rental propensity declines while the propensity to own increases. Renting is more common in metro areas compared to traditional areas. Children under the age of 18 are more dominant in households with a propensity to own compared to renting. In income categories above R3500 and more, rental is more dominant than those with low incomes (Simkins & Fonkam 2018).

Figure 1.4 from the GHS, explaining the distribution of ownership status for households living in formal dwellings show that the percentage of households living in wholly-owned dwellings increased from (52,9%) in 2002 to (54,3%) in 2017 indicating that more than half of South African home-owners have fully paid off their homes (Stats SA 2017c). However, those living in partially owned dwellings have had a significant decline from (15,3%) in 2002 to (8,8%) in 2017 (Stats SA 2017c). Rented dwellings have had an increase of almost five percentage points from (19,6%) in 2002 to (24,7%) in 2017 indicating that less than a quarter (24,58%) of South Africans are renters (Stats SA 2017c). Households that maintained tenure arrangements had a slight increase from (11,6%) in 2002 to (13,1%) in 2017 (Stats SA 2017c). Further the racial makeup of renters are as follows: Blacks (24%), Coloured (22,62%), Indian/Asian (28,65%) and Whites (29,89%) (Stats SA 2017c).

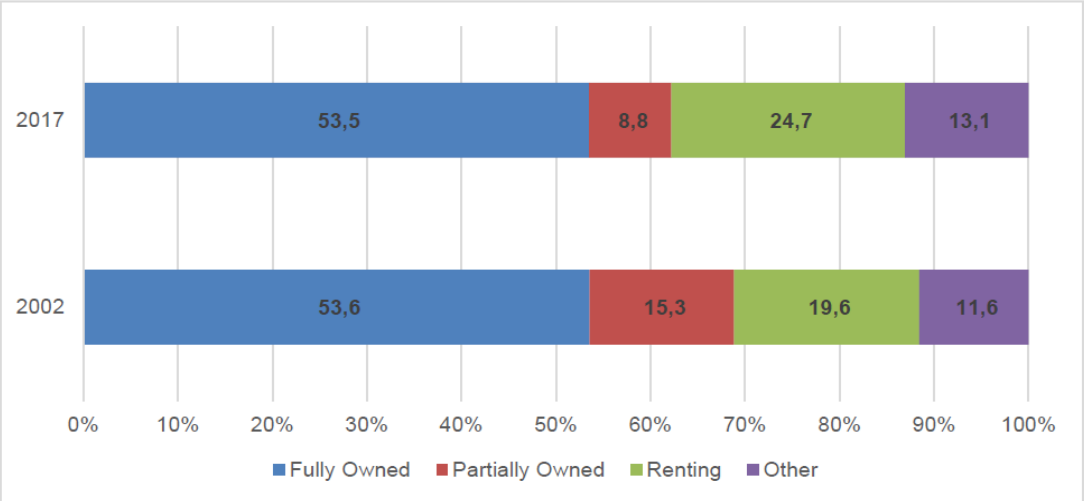

Figure 1.4 Ownership status of households living in formal dwellings

Source: Statistics South Africa (2017c)

When evaluating residential property sales in South Africa is on the increase as more and more South Africans are under financial pressure and forced to downscale. Property sales increased in the second quarter of 2019 to (19%) following (16%) in the first quarter of 2019, 60% of those selling due to financial pressures has opted for rentals rather than committing to buying a smaller property (Fin24 2019). Figure 1.5 encompasses the results of a property market survey by FNB where owners were given questionnaires and had to tick out reasons for selling their properties. Following the political uncertainty and lower-income growth results of the survey show that downscaling for financial pressure and emigration have been the main reasons for selling properties. The results of the survey itself show the importance of income on housing costs. Financial pressures forced owners to downscale as the bulk of their income spent is to furnish the housing costs, this itself is a direct indication that housing costs erode household income forcing households to find alternative ways of obtaining more disposable income.

Per cent of total sales

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019**
Downscaling for financial pressure	28.0	20.5	21.8	19.5	15.8	13.8	12.6	12.9	13.6	15.6	17.4
Downscaling with life stage	17.5	17.8	21.3	21.8	22.0	23.8	25.8	27.0	25.8	24.2	23.0
Emigrating	8.0	7.4	4.1	3.5	2.6	3.3	3.8	5.2	6.8	8.4	13.8
Relocating within South Africa	6.5	7.5	7.5	8.0	8.3	8.0	8.5	9.0	9.5	8.0	7.9
Upgrading	9.8	12.3	16.0	15.5	18.0	18.0	15.8	12.5	11.8	10.7	9.4
Moving for safety and security reasons	11.0	12.0	10.5	10.8	11.3	10.5	10.8	11.0	11.0	11.2	9.1
Change in family structure	13.8	14.5	11.8	13.5	13.0	13.5	14.5	15.5	14.3	15.1	12.4
Moving to be closer to work or amenities	5.8	8.5	7.0	7.5	9.0	9.0	8.0	7.3	6.5	6.4	7.1

Figure 1.5 Reasons for selling residential property

Source: First National Bank

2.9 Owners' equivalent rent in the calculation of rental inflation (housing costs)

In order to measure rental inflation, actual rental and OER is used to track movements in rental prices. Actual rentals are the amounts paid by tenants to the owners of a property which is usually bound by a rental agreement between the two parties (Stats SA 2017). OER is the opportunity costs that owners incur when these owners decide to live on their property instead of renting it out and measures the value derived by the owner according to the market value of the same type of dwelling. OER is a method adopted by many countries, including the US to estimate inflation and housing costs. OER plays a significant role in both the CPI and Personal Consumption Expenditure (PCE), in a South African context, an IES or LCS is used rather than a PCE survey. The importance of OER is due to the relatively large weight attached to it when all housing components become aggregated into an index (Higgins & Verbrugge 2014). The OER weight in the US CPI accounts for about 25% of the total index; therefore

with such a significant weight, the OER component can affect the overall inflation rate of any country significantly (Higgins & Verbrugge 2014).

Analysts often ask the question as to whether OER should be included in the calculation of rental inflation in the CPI. The basis of the argument for the removal of OER from the headline inflation calculation is when monetary authorities increase the interest rate, the cost of buying a property increases. Increased property prices place pressure on consumers, and this causes housing stock growth to decline, forcing consumers to opt for rental property as opposed to purchasing a property. (McCarthy & Peach 2010), disagrees with the above indicating that raising of interest rate merely means that it raises the affordability of qualifying for a bond to purchase a property. Increased affordability pressure, therefore, only makes the demand for rental property increase in retrospect of a bonded property. Subsequently, the rise in demand for rental properties creates a demand for the supply of such property and therefore, an increase in construction capacity to meet this demand.

The Euro Area and the UK follow the approach to remove OER from headline CPI calculation for reasons other than the above argument. The US, on the other hand, feels it is vital to include OER as it has a significant influence in the CPI and PCE (McCarthy & Peach 2010). Since February 2009, South Africa has adopted the OER approach in its calculation for housing inflation. Before this, the method used interest rates on mortgage bonds and was later excluded due to the circulatory effects when adjustments to interest rates occur.

The rental inflation index of South Africa comprises of five subcomponents: actual rentals for housing, OER, maintenance and repair, water and other services and electricity and other fuels. In terms of measuring OER, three conventional approaches are available comprising of rental equivalence, user cost, and the acquisition approach (Stats SA 2008a). The last two methods cannot be used as the data required for these approaches is not available in South Africa. The rental equivalence approach is data on rentals of equivalent dwellings which is not only available in the country but can be utilised with no significant risk of error (Stats SA 2008a). The treatment of housing in the South African CPI aligns itself to international standards. South Africa uses the rental equivalence approach as well as countries like the US, Germany, Singapore, Japan, Netherlands, Norway and Poland following this approach. The matching of dwellings occurs according to location and physical characteristics, with rental equivalence for owner occupied dwellings comprising the use of rental values for similar dwellings (Stats SA 2008a). Figure 1.6 adapted from CPI metadata incorporates time series from January 2009 to August 2019 showing the movements of headline CPI, actual rentals and OER.

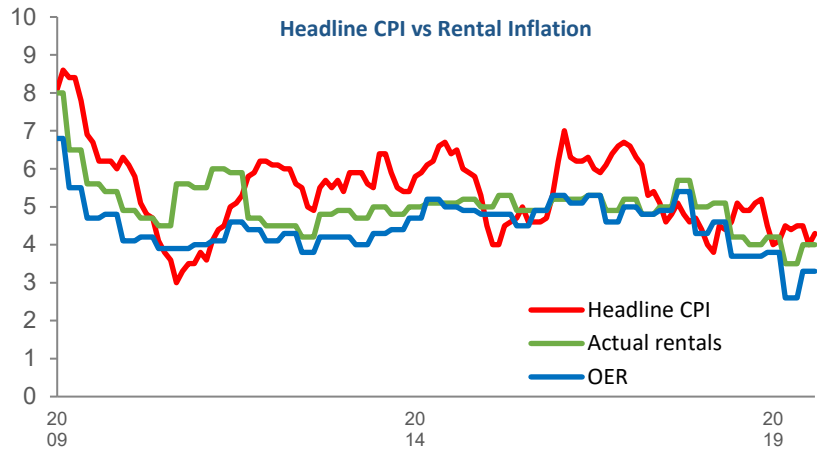

Figure 1.6 Headline CPI, Actual Rentals and Owners Equivalent Rental Inflation

Source: Statistics South Africa Metadata (2019)

Based on the results, headline inflation was higher than actual rentals and OER in most periods. When comparing actual rentals to OER, actuals rentals are higher than OER even though the weight attached to actuals rentals is lower. The weights provided are based in on the relative importance of items in the housing component of the CPI. OER has a more significant weight (13,32%) when compared to actual rentals for housing with a weight of (3,52%) (Stats SA 2019b, p7).

The reason for actual rentals being higher than OER is due to actual rentals fluctuating more often due to yearly increases which are better tracked than OER data seeing as OER estimated hypothetically. In the case of Germany, actual rentals were much higher than OER, and those households found in the bottom income category saw that their share of income spent on housing rises much more when compared to higher-income categories (Dustmann et al 2018). According to (Verbrugge 2007), the increase in actual rentals is due to at least one utility such as water or electricity included in the rental amount, as opposed to OER where an owner will directly pay the utility bill themselves and sure to exclude the amount from the OER price or calculation. In a later paper (Verbrugge 2012), found that the adjustment on utilities rarely drove the divergence between OER and rental inflation. The cost of water in South Africa is often included in the levies on sectional title properties meaning there is no separate water bill sent to owners or tenants. Levies paid to managing agents or trustees are the funds that the body corporate utilises to maintain the communal property of the building. Monies received from levies cover building insurance, managing agent's fees, administration fees, communal electricity, maintenance of communal areas and water. Statistics South Africa, however, when collecting rental data records the utility component separately from the rental price and in cases where the utility component forms part of the price, an estimation of utility cost is recorded separately and subsequently

removed when performing the calculations for rental inflation. Calculations are therefore based solely of pure rental prices in terms of costs of using the property.

CHAPTER 3: METHODOLOGICAL DESIGN

3. METHODOLOGY

This section of the paper will discuss the methodology used in the study by starting with explaining in detail primary and secondary area classification, by identifying the criteria used by Statistics South Africa when selecting and classifying these areas which are an indication of the most representative sample of households that fall within these areas. Aggregation of data follows, with the calculations used to derive indices necessary for interpretation of results. Lastly, all data sources consulted in the study is described.

3.1 Methodology introduction

Inductive research will be undertaken for this study where according to (Babbie 2015) is the process of unfolding and or examining specific observations in order to generate theories and find the reasoning for particular patterns in the data. Time series data will be used from January 2009 to August 2019 to perform analysis, search for patterns within the data and draw reliable conclusions when examining data variables.

3.2 Primary and secondary areas selection and classification

Although the literature discusses household income, spending and migration patterns at the provincial level, during analysis, these provinces will be evaluated in detail in terms of primary and secondary areas within the provinces. As mentioned in the background, primary and secondary areas refer to the larger cities and towns in each province. Municipal boundaries as applicable in the Census, define the demarcation boundaries of each primary area such as the City of Cape Town, eThekwini and the City of Johannesburg (Stats SA 2009). Secondary areas defined by the continuous built-up area known by that name rather than municipal boundaries, which in many cases include substantial rural areas (Stats SA 2009). Analysis of primary and secondary areas provides a more detailed level of information that enables the reader to understand the area dynamics much clearer.

The geographical coverage used by the CPI identifies areas with the highest levels of consumer economic activity where a combination of data sources used to rank different areas. The ranking of areas at the national and provincial level used socioeconomic variables of each city or town. According to (Stats SA 2009), variables obtained based on the Census results include the number of employed people since employment correlated with economic activity and expenditure; the employment rate in an area as a higher number of people employed in an area is an indication of higher levels of expenditure, and lastly population is used as indicator of economic activity to establish the size of an area. Another

general indicator is the presence of chain stores in an area indicating for potential consumer expenditure, the more chain stores in an area, the higher the potential consumer expenditure in that area.

Primary areas are closely related to if not in some cases referred to as a metropolitan area for a specific province. South Africa has eight metropolitan areas; for this study, only six metropolitan areas data is used as primary areas. Table 1.1 indicates those primary areas that fall under a metropolitan area. The remaining two metros, namely Durban and Bloemfontein, cannot be used as Durban's data is combined with Pinetown and Bloemfontein's data is combined with Welkom's data, both being secondary areas. Primary areas are usually categorised as highly populated, and secondary areas try to alleviate demographic pressures from primary areas and act as catalysts for the development of surrounding regions and areas (John 2012).

Table 1.1 Primary and secondary area sample selection

Province	**Primary Areas**	**Secondary Areas (Combined)**
Western Cape	Cape Peninsula *(metro)*	George, Paarl and Worcester
Eastern Cape	Port Elizabeth *(metro)* East London *(metro)*	Queenstown, Grahamstown and Port Alfred
Northern Cape	Kimberly	De Aar and Kuruman
Free State	Bloemfontein and Welkom	Bethlehem and Kroonstad
Kwa-Zulu Natal	Durban and Pinetown Pietermaritzburg	Newcastle, Stanger, Ladysmith and Empangeni
North West	Rustenburg	Mafikeng, Brits and Potchefstroom
Gauteng	Tshwane *(metro)* City of Johannesburg *(metro)* Ekurhuleni *(metro)*	Krugersdorp, Vereeniging and Vanderbiljpark
Mpumalanga	Nelspruit and Witbank	Ermelo and Secunda
Limpopo	Polokwane	Tzaneen and Phalaborwa

Source: Statistics South Africa (2009)

3.3 Housing sample

A sample of selected properties with rental price data from each primary and secondary area was extracted approximating to a total of over 7 100 price records. A further sample of 23 000 households was used for core analysis that tracked the income, expenditure and housing costs of these households from October 2014 to October 2015. The IES and LCS compiled and released by Statistics South Africa tracks household expenditure from a sample of selected households for a specific reference period and the information gathered and used identifies how households spend their income. A further breakdown

of household spending by primary and secondary areas provides vital information on understanding spending patterns within different regions.

3.4 Aggregation of data and calculation of indices

Rental data is collected on a monthly basis; however, aggregation is done one a quarterly basis. Aggregation as defined by (Green 1954), as a process whereby many prices, records or numbers are replaced by a single number called an aggregate. Aggregation is often used when there is assurance in the consistency of the results when opting to use aggregates instead of more detailed information.

The calculation of quarterly aggregate price relatives occurs, which is basically the ratio of the rental price from one period to another. Statistics South Africa does not publish indices for primary and secondary areas but only provincial-level indices. For this study, aggregate price relatives are used to derive a monthly index for each primary and secondary area from January 2009 to August 2019. After index derivation, year on year changes are tracked and analysed. An index is then calculated for both actual rentals and owners' equivalent rent as weighted average changes from the sample of housing units. A further breakdown of indices is calculated for dwelling type in terms of houses, townhouses and flats. These indices help to analyse trends across primary and secondary areas in South Africa in terms of dwelling type.

Further in the study, different weights are applied to each primary and secondary area in terms of actual rentals, OER and type of dwelling. A geometric mean is calculated within a given area for the prices relatives of each of the three dwelling types. In the same manner, the derivation of indices for sectional title levies and assessment rates for each area occurs to determine if any correlation and relationship exist between these variables and housing costs. Graphing of the yearly changes follows using the time series to identify possible trends between the variables. For confidentiality issues, weights at primary and secondary area level will not be disclosed but will be applied to the study; however, the weights for all urban areas which is for the headline inflation index is provided as a reference in Table 1.2.

Table 1.2 Housing weights in the 2019 CPI

Variable	**Weight**
Actual rentals for housing	3.52
Owners' equivalent rent	13.32
Maintenance and repair	0.82
Water and other services	3.16
Electricity and other fuels	3.80
Total Housing	**24.62**
Actual rent - house	2,05
Actual rent - flat	1
Actual rent - townhouse	0,47
Imputed (OER) - house	11,58
Imputed (OER) - flat	0,47
Imputed (OER) - townhouse	1,27

Source: Statistics South Africa (2019b)

3.5 Deriving results and interpreting findings

Quantitative analysis was undertaken in order to identify common patterns and trends to achieve the research aims and objectives. Interpretation of results and plots encompassed the use of multivariate distribution of correlation analysis and multiple linear regression (MLR). Correlation and linear regression were chosen as both quantify trends and through the use of time-series data, these trends will give meaningful insight into the body of knowledge in this area of study.

The correlation used, determines the extent to which variables in the study describe the strength and relationship between household income and housing costs (rental inflation) and housing costs to assessment rates and sectional title levies. This research hypothesises that there is an inverse or negative correlation between housing costs (independent variable) and household income (dependent variable), as property costs increase, disposable household income decreases. The relationship will show how the cost of housing in South Africa poses a problem for growth households and the nation as a whole. With every increase in housing costs, households have to sacrifice other living needs to furnish these costs and are unable to have adequate money for savings. Through the development of a rental index per primary and secondary areas, a comparison of rental inflation will be undertaken together with the evaluation of household income across the areas to understand how are these provinces are developing. Sectional title levies and assessment rates on the property will be plotted against housing costs to determine the type of relationship that these variables share with housing costs. By evaluating these variables, the study will be able to show if there are disparities amongst different provinces when it

comes to expenditure on housing. The study examines the supply of housing focusing on houses, townhouses and flats at the metropolitan area level by performing time series analysis on building plans completed. By performing a time series analysis on the supply of housing by dwelling type, the study will be able to identify which metros are providing what type of dwelling structure. Spatial development patterns can be determined, which indicates which provinces are leading in terms of development as a city and a province at a whole.

Although correlations are useful, the predictive power of variables cannot be addressed; therefore, regression is then used (O'Brien & Scott 2012). To understand the predictive power between housing costs on household income, after the casual relationship is confirmed and the extent to which the change of the value of household income caused the change in the value of housing, encompassed the use of regression analysis.

During core analysis, MLR was chosen, which used different explanatory variables to predict the outcome of the response variable (housing costs). The following formula was applied:

$$yi=\beta0+\beta1xi1+\beta2xi2+...+\beta pxip+\epsilon \qquad (3.1)$$

Where: i=n observations, yi is the dependent variable, xi is explanatory variables, β0 is the y-intercept, βp is the slope coefficients for each explanatory variable and ϵ is the model's error.

3.6 Data sources

Statistics South Africa's CPI publication will be the primary source of reference for this study for rental data, followed by the Living Conditions Survey for income and expenditure data. The accuracy for the matching of income, expenditure and rental data from the same households encompassed only the use of LCS data for the core analysis. The term housing costs for purposes of this study refer to solely to owners' equivalent rent and actual rental received. The use of primary and secondary areas was strictly determined by the availability of data.

Within the CPI department, a quarterly rental survey operates, to collect data on the actual rentals and OER and where the difference between the two lies in their respective weights of the different accommodation types found in the two markets (Stats SA 2008b). The rental survey tracks actual rental prices for specific dwellings based on type namely; houses, townhouses and flats, the prices are then compared every quarter and covers a wide geographic spread. Stats SA collects rental data from letting agents who provide them with rentals for specific dwellings, and these dwellings a tracked over time. A sample selected from the records of the letting agents comprising of rental prices as well as all other additional charges is recorded in order to make sure that pure rental is tracked (Stats SA 2008b). Together with the rental data, sectional title levies and assessment rates data will be used to create indices for selected primary and secondary areas for data comparison and analysis.

The IES and LCS will be used to track household income, whereby the relationship of rental expenses against the erosion of total household income will be analysed. The main focus of the IES and LCS survey is on income, consumption, and the patterns of spending of households at both provincial and national levels (Stats SA 2012).

The Building Statistics survey which collects information on building plans passed and those completed from the largest municipalities and for which is financed by private institutions (Stats SA 2019c). The data in this publication will help to identify the type of dwellings municipalities are constructing be it houses, townhouses or flats. This information helps to identify further how the selected areas are developing spatially in terms of growth and provision of housing.

CHAPTER 4: EMPIRICAL ANALYSIS

4. EMPIRICAL FINDINGS

4.1 Introduction

This section will discuss the empirical findings of the study, which starts by analysing different variables before getting into the core analysis. The first variable analysed was rental importance by dwelling type to identify which dwelling type structure is of more or less importance across the selected primary and secondary areas. Analysis by dwelling type according to their various weights attached to the type of structure following the CPI weights listed follows. The second variable analysed was actual rentals and OER in the selected primary and secondary areas where rental indices are derived and analysed to identify if any patterns or trends exist in these areas in terms of housing costs. The third set of variables analysed are housing costs, assessment rates and sectional title levies to identify if any correlation exists between these variables. Lastly, the supply of housing analysis takes place before moving on to the core analysis. The analysis of housing supply occurs in terms of which metropolitan areas are leading in urban development and contributing factors to supply of housing in these areas. The core analysis which the primary analysis for this study focuses on the relationship between housing costs and household income and other variables used in core analysis include the age of the head of household and sex of head of the household.

4.2 The importance of rental in South Africa based by dwelling type

The South African CPI tracks housing inflation based on three categories of dwelling type, namely; houses, townhouses and flats and their relative importance is an indication by the different weights that are attached to each dwelling type. It is important to note that informal dwellings are another crucial form of housing in South Africa accounting for (13,9%) living in informal dwellings, with the North West and Gauteng having the highest concentration of informal dwellings at (20,8%) and (19,8%) respectively (Stats SA 2019a). Limpopo is the province with the lowest number of informal dwellings, however, has the highest number of tribal settlements. To explain this in more detail, we take a look at Polokwane situated in the Limpopo province where we see decreases in informal structures within the area. Table 1.3 reflects the reduction in the number of informal structures by residents moving into formal brick structure houses. The increase in occupancy of houses from 1996 to 2016 increased by (151%) while the number of informal structures decreased from 2001 to 2016 by (42%) (Stats SA 2019a). These numbers are an indication of the performance of the metropolitan area as a whole as increased urbanisation takes place together with a growing economy in the area making it more affordable for residents to move into houses.

Table 1.3 Settlement structures in Polokwane

	1996	2001	2011	2016
Total number of houses	85 373	124 978	178 001	214 464
Number of informal structures	10 447	19 476	16 044	11 231
Percentage informal		15,6	9	5,2

Source: Statistics South Africa (2017b)

Figure 1.7 and figure 1.8 shows the distribution by weight of the relative importance of houses in both categories of rentals, namely; actual rentals and OER across the primary and secondary areas. In the secondary areas, although OER on houses is higher than actual rentals on houses, the difference between the two is not as significant when compared to primary areas. The implication is that South Africans living in secondary areas may not necessarily choose to live in their own house compared to primary areas where living in one's own house is more dominant. Secondary areas comprise of houses that are with owner-occupied or rented out to others, and there is no dominance of either type of housing tenure, unlike in primary areas. Areas with the lowest weight on housing all fall within primary areas with Durban and Pinetown (36,68%) and Kimberly (40,54%) for actual rentals on houses. Pietermaritzburg with the lowest weight on OER on housing at (73,65%) reinforces the importance of houses in South Africa. Although (73,65%) is reflected as the lowest weight for OER on houses, when comparing the weights of OER on houses for all primary and secondary areas, the weights on houses are significantly higher overall compared to flats and townhouses.

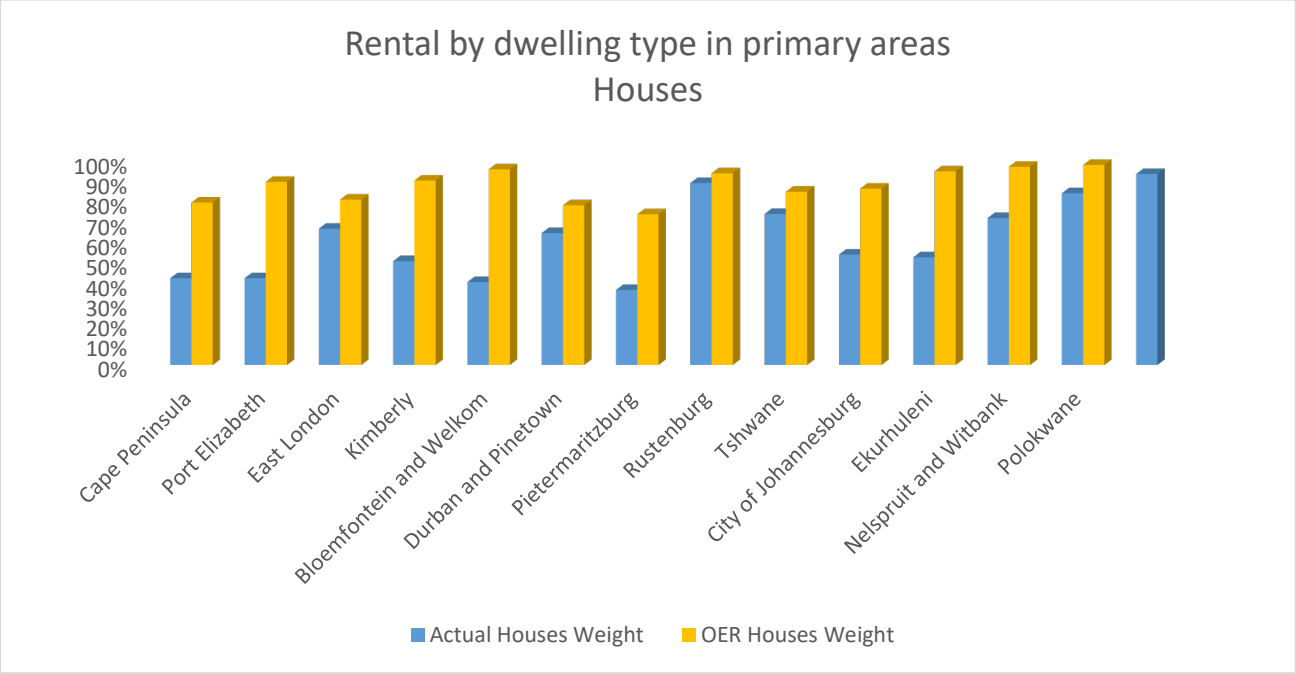

Figure 1.7 Rental weight of houses in primary areas

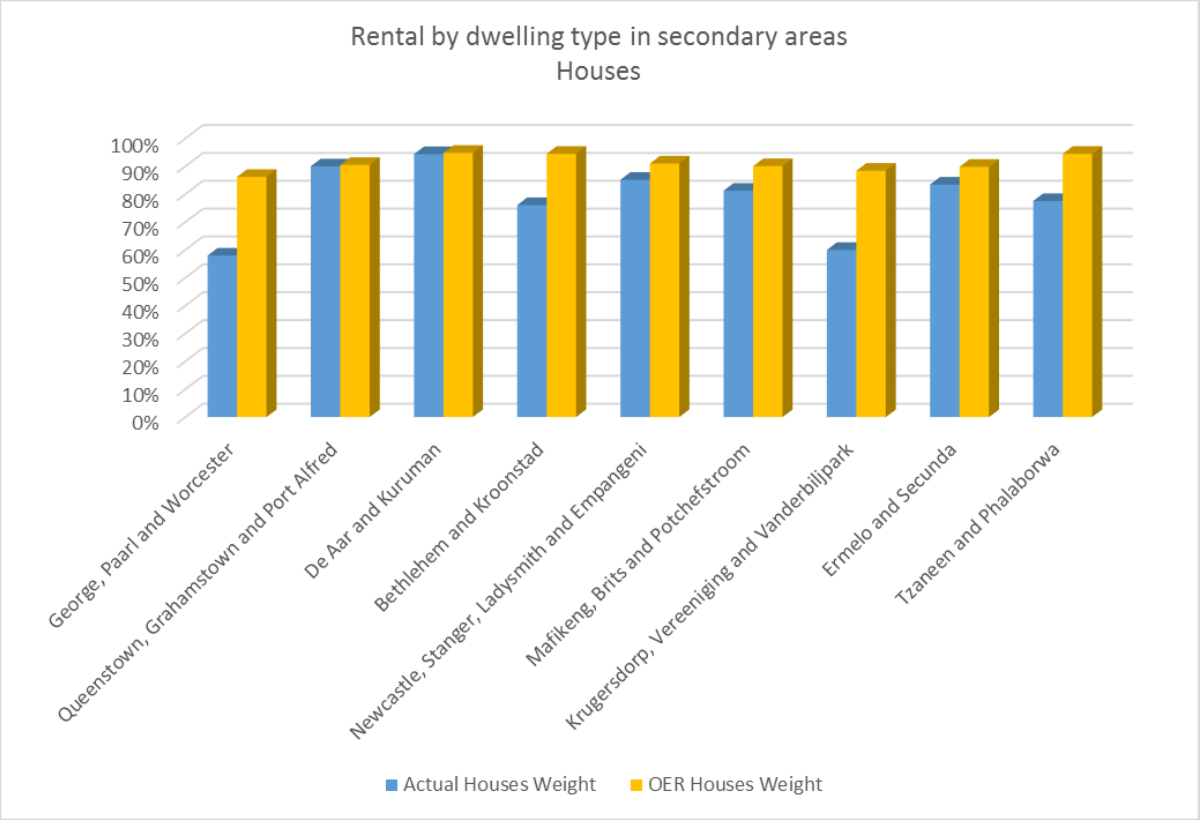

Figure 1.8 Rental weight of houses in secondary areas

Figure 1.9 and figure 1.10 shows the distribution by weight of the relative importance of flats in both categories of rentals, namely; actual rentals and OER across the primary and secondary areas. The weights for flats, when compared to houses, is about half the percentage that of houses showing that flats are not the ideal choice of dwelling type. Durban and Pinetown and Pietermaritzburg are the two primary areas with the highest weights for flats at (55,03%) and (43,79%) for actual rentals on houses and (10,15%) and (6,27%) for OER on houses respectively. The indication is that the majority of residents from KwaZulu Natal purchase and choose to live in their flats. It is interesting to note that the weights for OER on flats are very low overall in all primary and secondary areas which illustrate once more that South African's would instead rent their flats out to others and most likely choose an alternative dwelling type like houses or townhouses. Areas such as De Aar and Kuruman and Nelspruit and Witbank have the lowest weight on flats as there have been minimal residential developments on flats even though the demand is prevalent. De Aar and Kuruman situated in the Northern Cape province has vast amounts of open land; however, very little economic activity apart from a few mining operations. The volatility of mining operations places a restraint on the province to develop the area in terms of new residential development as the population is small and should the mining operations cease, the possible fruitless expenditure would have taken place in terms of residential developments.

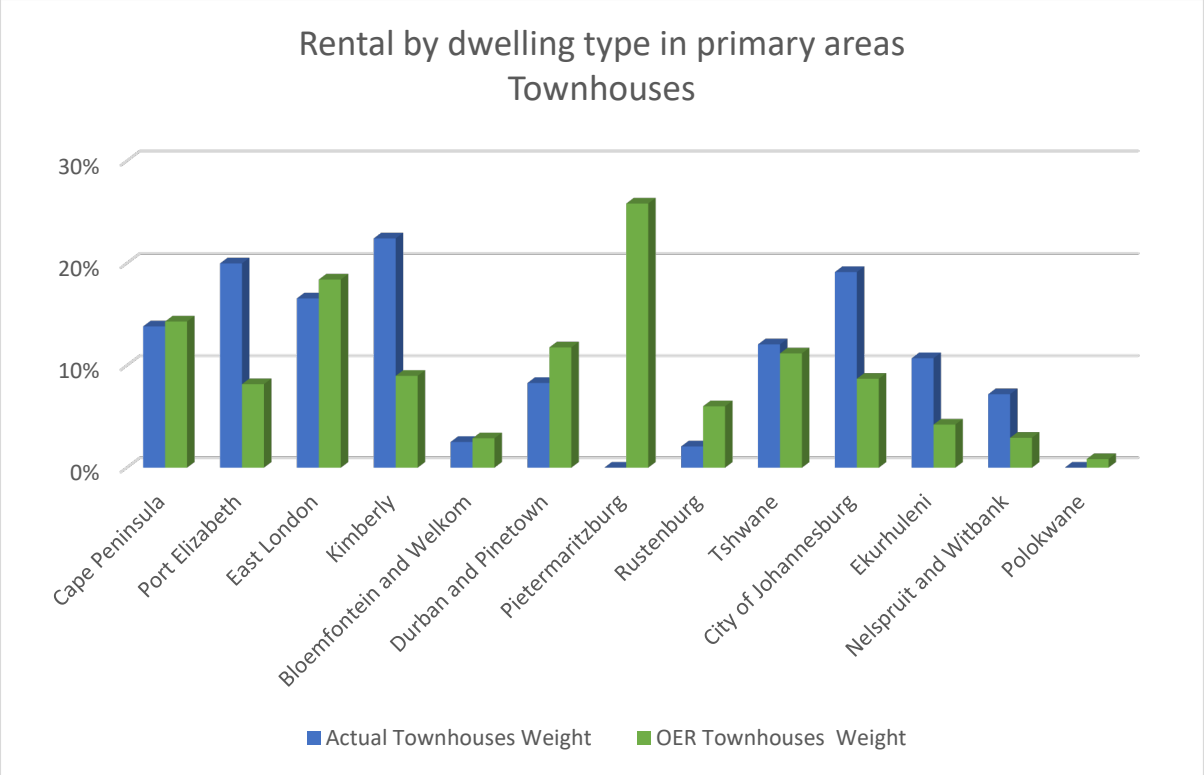

Figure 1.9 Rental weight of townhouses in primary areas

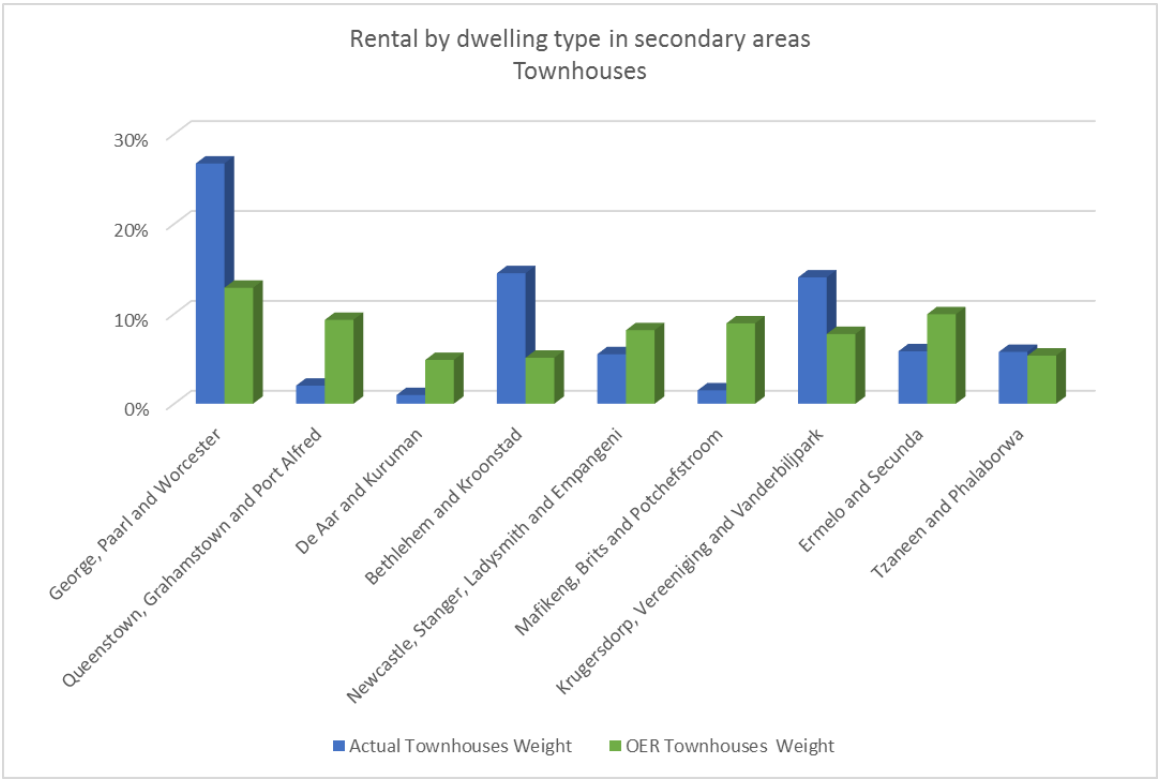

Figure 1.10 Rental weight of townhouses in secondary areas

Figure 1.11 and figure 1.12 shows the distribution by weight of the relative importance of townhouses in both categories of rentals, namely; actual rentals and OER across the primary and secondary areas George, Paarl and Worcester (26,73%), Port Elizabeth (19,99%) and City of Johannesburg (19,14%) have the highest weights for actual rentals on townhouses. For OER on townhouses, the two primary areas with the highest weighting are Pietermaritzburg (25,84%) and East London (18,42%). Townhouses are most dominant in primary areas with three of these primary areas classified as metropolitan areas; this shows the popularity, importance and demand for townhouses are much higher than that of flats and will most likely continue to grow in the metros. Interestingly actual rentals on townhouses in Pietermaritzburg and Polokwane has a weight of (0%) indicating that the townhouses are not the dominant structure present and confirms the situation about houses in the area illustrating that houses are a significant part of the dwelling structure prevalent in the area.

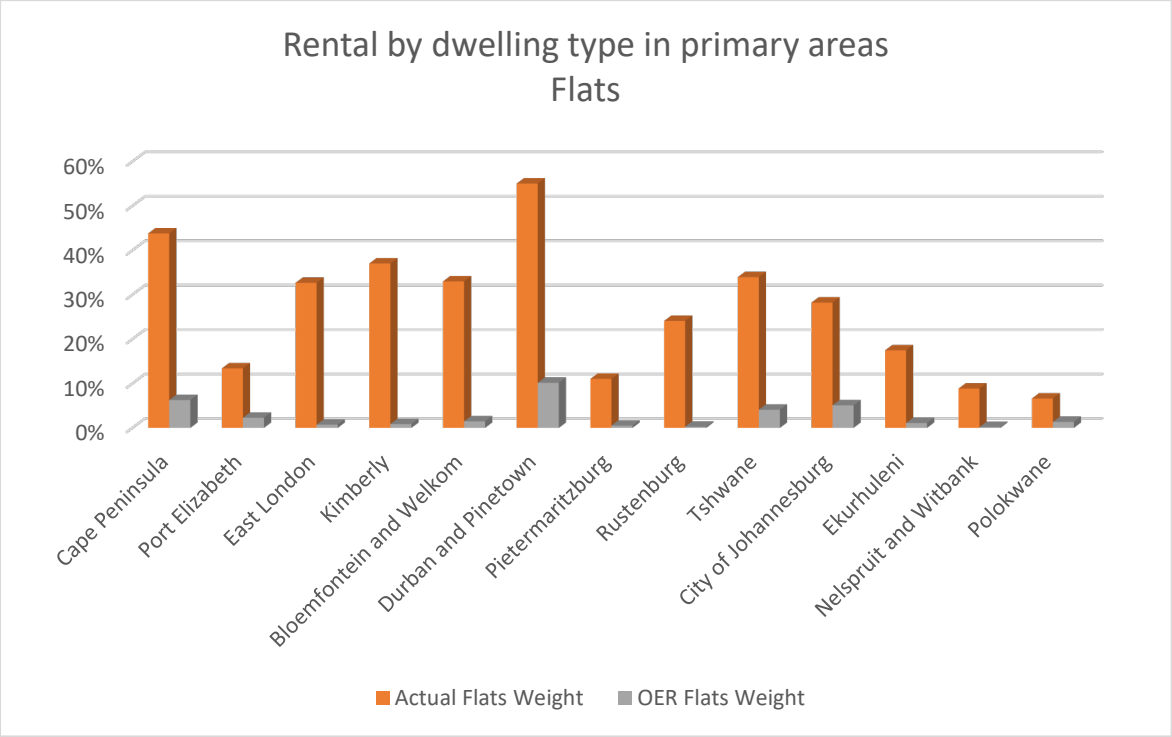

Figure 1.11 Rental weight of flats in primary areas

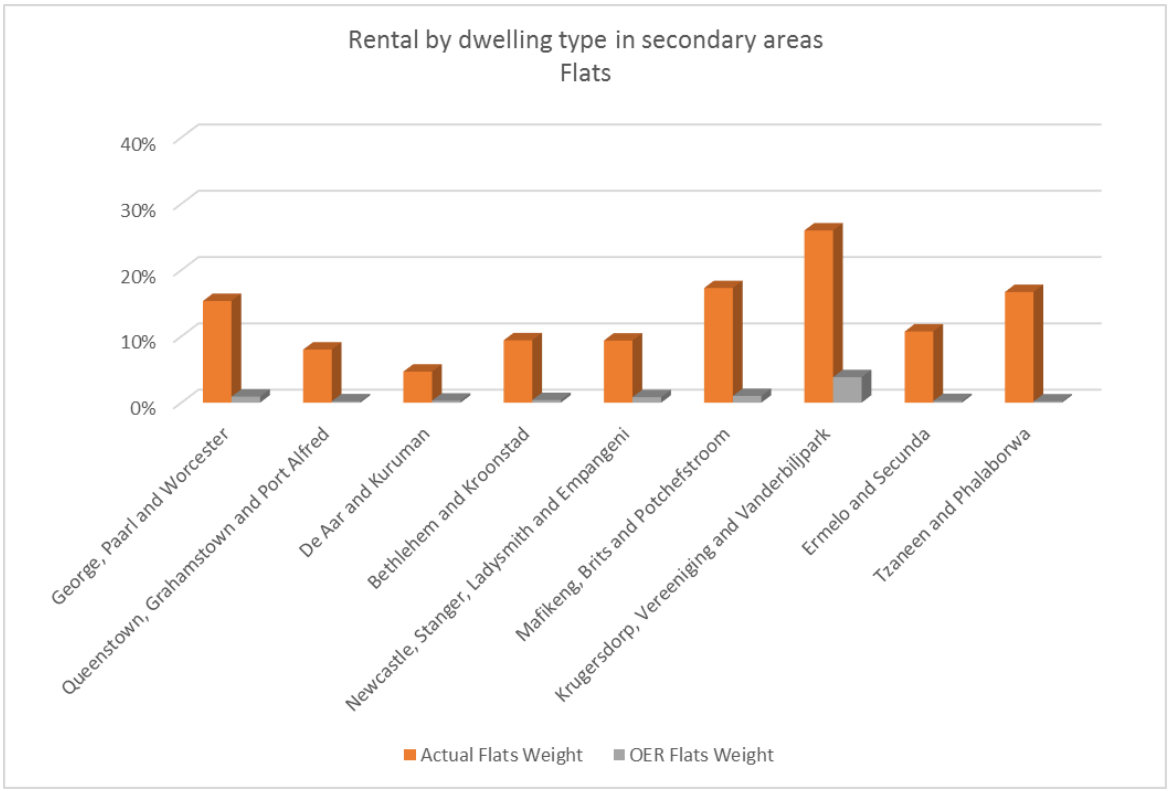

Figure 1.12 Rental weight of flats in secondary areas

4.2.1 Conclusion

When analysing the rental importance by dwelling type, results show that OER in South Africa is an important aspect when determining ownership of property. OER implies that the owner chooses to live in his or property as opposed to renting it out and from the results of the analysis, owners in both primary and secondary areas choose to live in their property rather than renting it out. Houses are the dominant dwelling type for South African's as more people choose to live in houses compared to flats and townhouses. Living in a house compared to a townhouse or flat could stem from a variety of reasons being it size of household, budget or lifestyle needs. Considering the current crime situation one would expect that living in secured complexes would dominant in structure type as these more often encompasses flats and townhouses. However, growing demand for townhouses exists, especially in the metros indicating that the metros are continuously growing and with that demand is on the increase. By analysing the weights attached by dwelling type across the primary and secondary areas, developers are provided with better insight as to what dwelling structure needs are applicable in a specific area. Developers are now able to cater to this demand focusing on the specific needs of the area makeup, avoiding fruitless expenditure on development that will not be met with adequate demand. Further, municipalities can use land more optimally that can benefit the population in that area, socially, economically and environmentally.

4.3 The comparison of actual rentals and OER across primary and secondary areas

As mentioned previously, the evaluation of housing costs in this study encompasses the evaluation of rental on housing which comprises of actual rentals and OERs. Figure 1.13 to figures 1.32 reflects time series year on year changes for actual rentals and OERs within the thirteen primary and nine secondary areas in South Africa. The time series runs from January 2009 up to August 2019. When comparing actual rentals and OER, results show that in the majority of primary and secondary areas, both actual rentals and OER follow the same trajectory; however, actual rentals being slightly higher than OER. Actual rentals being higher than OER is consistent with the literature when a comparison was made for actual rent and OER for all urban areas. One of the reasons for the difference by actual rentals fluctuating more than OER is due to actual rental being more accurately tracked, whereas OER is estimated hypothetically. The findings from (Dustmann et al 2018), also show in the case of Germany, actual rentals were higher than OER. Owners are subject to levies, assessments rates and repair and maintenance costs for property and often owners end up paying much more for a home than renters. One of the underlying reason for this difference between actual rentals and OER could be the passing of such costs onto tenants pushing up actual rental prices compared to OER.

South Africa's housing boom was experienced from 2000 up to 2006 and comprised of four driving factors (Delmendo 2019).

a) Significant increase in housing demand with the emergence of the financially stable black middle class. The implementation of individual tax reliefs helped boost the financial position of the black middle class
b) Increased investment in property due to South Africans forced to bring back offshore money that was kept away during the apartheid era by September 2004
c) Property prices during apartheid trailed the economy with the security situation worsening, post-apartheid accompanied better security and stability
d) There was a boost in home loan growth with the introduction of the Financial Sector Charter in 2003, whereby R42 billion was committed for provision to low-income groups by financial institutions. In 2006 saw the capital gains tax exemption being raised on primary residences from R1 million to R1.5 million together with a decrease in transfer duties.

After that, from 2008 to 2009, entered the global recession where house prices fell by 16.5% in real terms (Delmendo 2019). Together with the recession and increasing interest rates came the introduction of the National Credit Act in the middle of 2007, whereby banks restricted lending. The affordability of households questioned in terms of high debt-to-income ratios which made household struggle to obtain finance, ultimately leading to household opting to rent due to the restriction in purchasing a property. This financial pressure and change in tenure are consistent with the study of (Mcarthy & Peach 2010).

4.3.1 Primary areas

Figure 1.13 to Figures 1.25 reflects actual rentals and OER of primary areas. Results show that the areas which experienced the highest increase in housing costs from September 2008 to September 2009 were the City of Johannesburg (18,78%), Durban and Pinetown (18,36%) and Pietermaritzburg (17,50%) while Kimberly and Tshwane were the only areas not affected by the housing crises. However, from September 2009 to September 2010, these two areas saw the highest increases in housing costs while other primary areas experienced a decline. The most significant decreases in housing costs occurred in September 2010 from Durban and Pinetown (-12,76%), followed by City of Johannesburg (-11,21%) and Pietermaritzburg (-6,45%). These areas were the same areas that accounted for the highest increases in September 2009, showing that the cost of housing stabilised after the recession. From September 2012 to September 2013, the country saw another boom in housing costs this time at a much higher rate. Nelspruit and Witbank experienced the highest cost of housing at (26,54%), primarily due to supply and demand. During this period there was an establishment of new power stations and mines which caused an influx of migrants into the area. Due to Sasol being not far in terms of travelling distance accompanied by its annual shutdown, large amounts of migrants flocked to surrounding areas requiring accommodation more especially rental accommodation, which increased the cost of housing. The construction of the Kusile power station pushed the demand for housing with the recruitment of contract specialists to complete the project mostly from other countries, while rental prices were at a premium with limited supply. With the establishment of new mines in the Nelspruit and Witbank area, mineworkers from Rustenburg transferred to the former area. Results show that Rustenburg experienced a decline in housing costs, mainly due to the migration of workers to Nelspruit and Witbank. These movements are consistent with the literature on internal migration patterns where migrants venture to new surroundings where there is a burst of economic activity and increased industrial development. As stated by Larkin et al. (2018), increased migration increases demand for accommodation leading to higher house prices. An increased demand follows for housing usually rental properties at first, pushing up the cost of housing and with limited supply, the costs are merely exuberated. Increases in housing costs experienced in these areas relate to the study of (Mare & Stillman 2008), where both the magnitude and structure of flows together with the supply elasticity affected the price of housing. Following Nelspruit and Witbank, Bloemfontein and Welkom experienced a (23,07%) increase in the cost of housing for the same period, particularly from OER. The main reason for these increases was due to supply and demand, particularly strong growth in public sector employees. The development of the Westlake suburb in Bloemfontein saw increased rental prices due to demand outweighing supply. Westlake property was offered at premium prices, making it only available to selected households based on affordability, making it very expensive for ordinary people to purchase the property. Polokwane with a (19,25%) increase in the cost of housing was again primarily due to industrial expansion with low rental stock which resulted in abnormally high prices (Payprop 2014). As identified by (Higgings &

Verbrugge 2014), an optimal weight should be placed on OER as any changes to this index affect the inflation rate of the country significantly, and this is consistent in areas such as Nelspruit and Witbank and Bloemfontein and Welkom, where their highest weighting for housing costs or rental inflation came from OER rather than actual rentals.

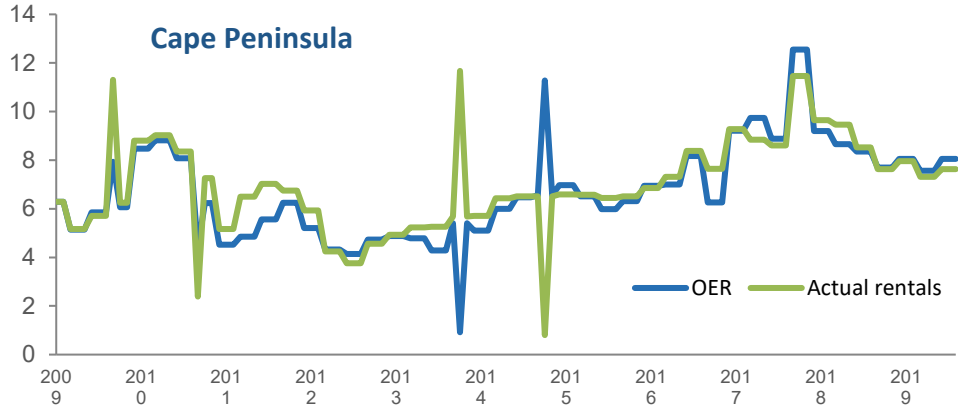

Figure 1.13 OER versus actual rentals Cape Peninsula

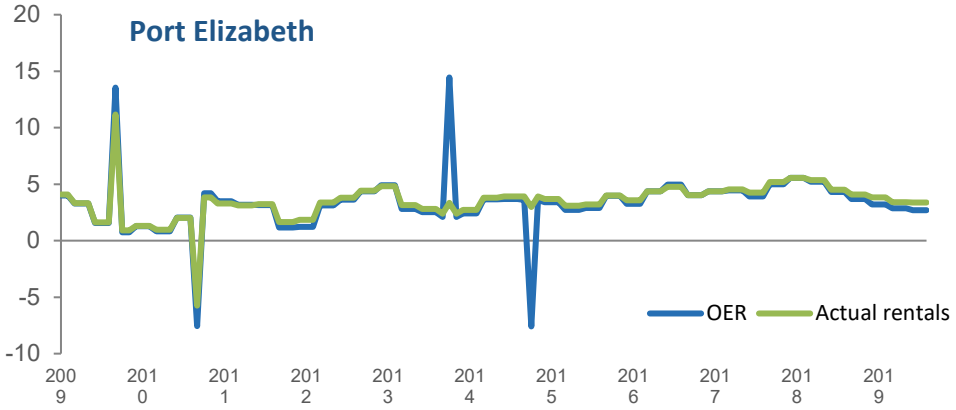

Figure 1.14 OER versus actual rentals Port Elizabeth

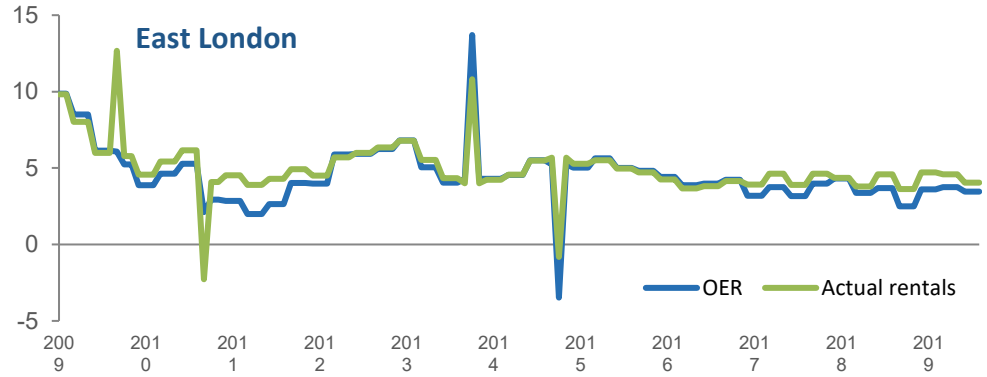

Figure 1.15 OER versus actual rentals in East London

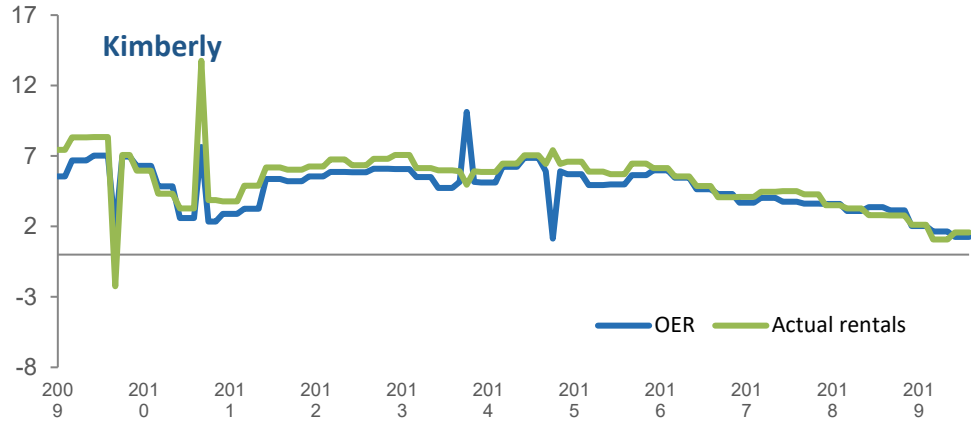

Figure 1.16 OER versus actual rentals Kimberly

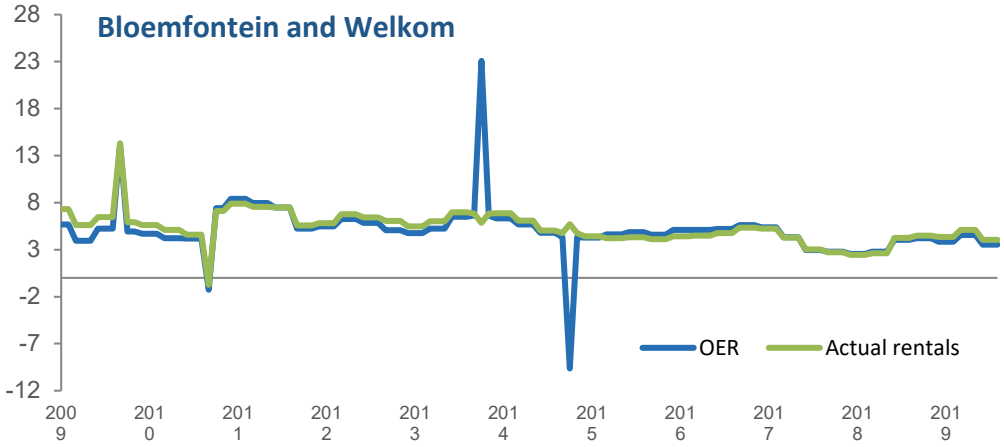

Figure 1.17 OER versus actual rentals Bloemfontein and Welkom

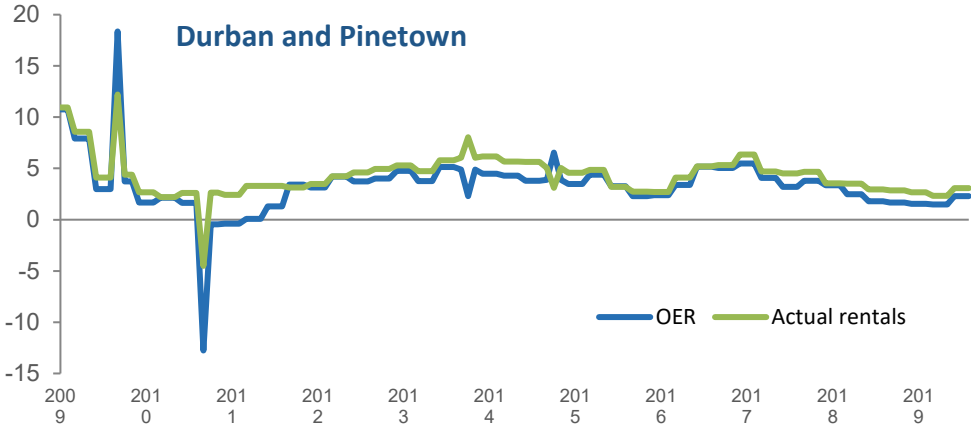

Figure 1.18 OER versus actual rentals Durban and Pinetown

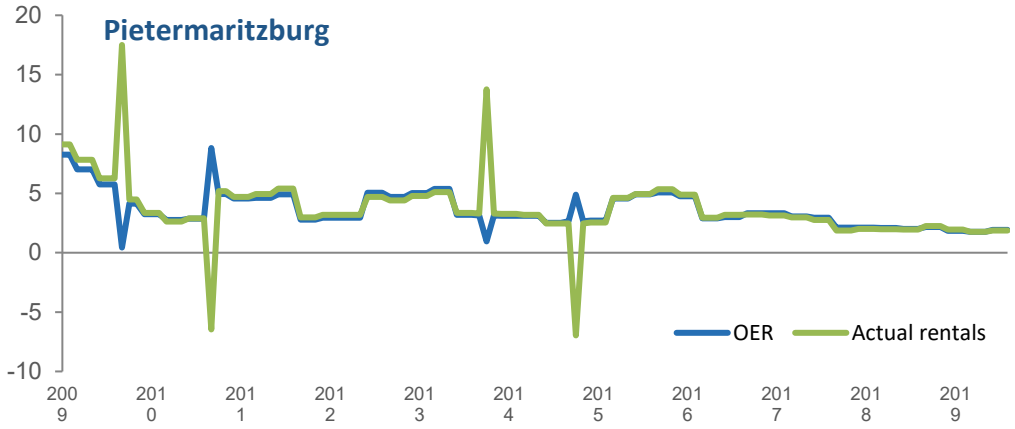

Figure 1.19 OER versus actual rentals Pietermaritzburg

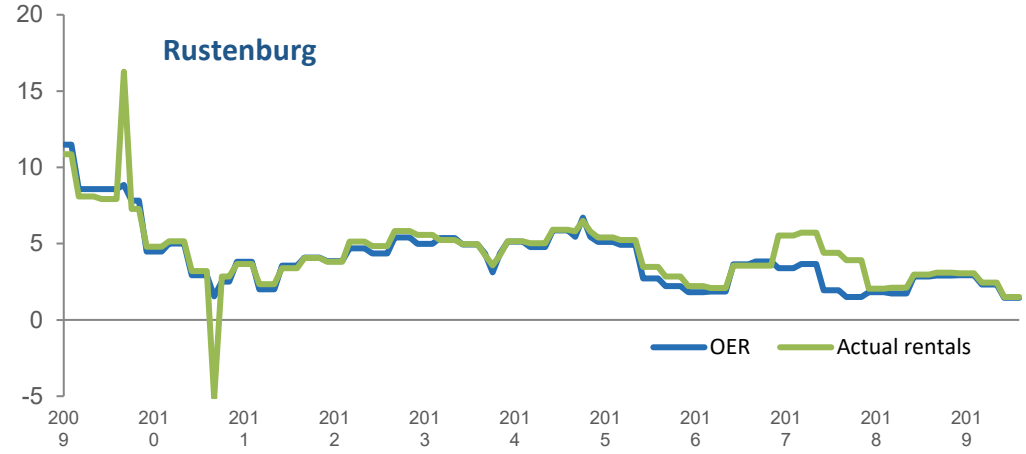

Figure 1.20 OER versus actual rentals Rustenburg

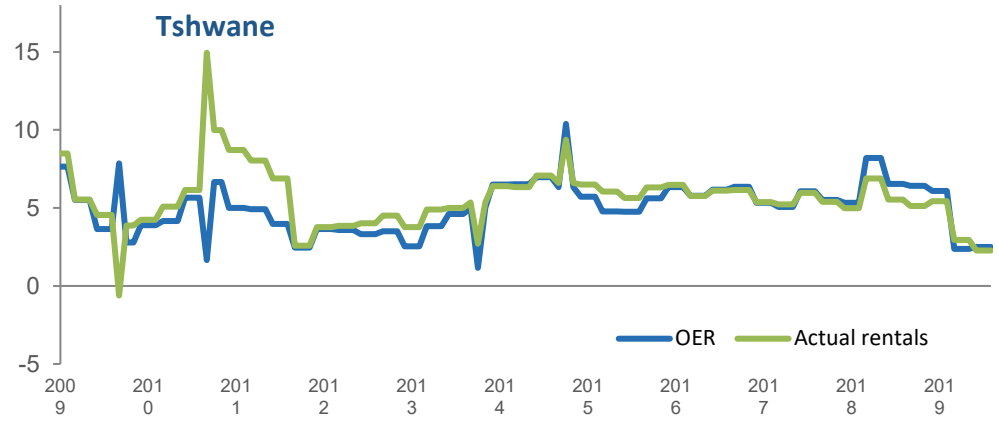

Figure 1.21 OER versus actual rentals Tshwane

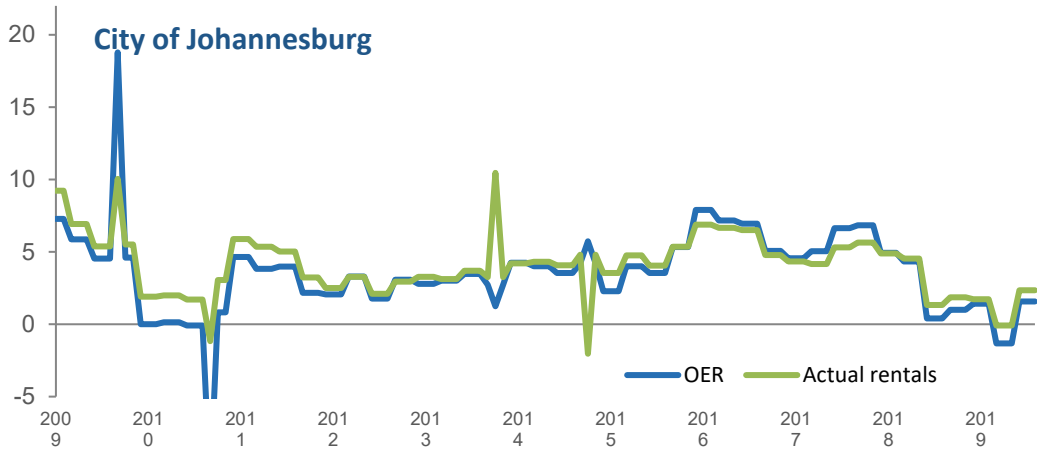

Figure 1.22 OER versus actual rentals Johannesburg

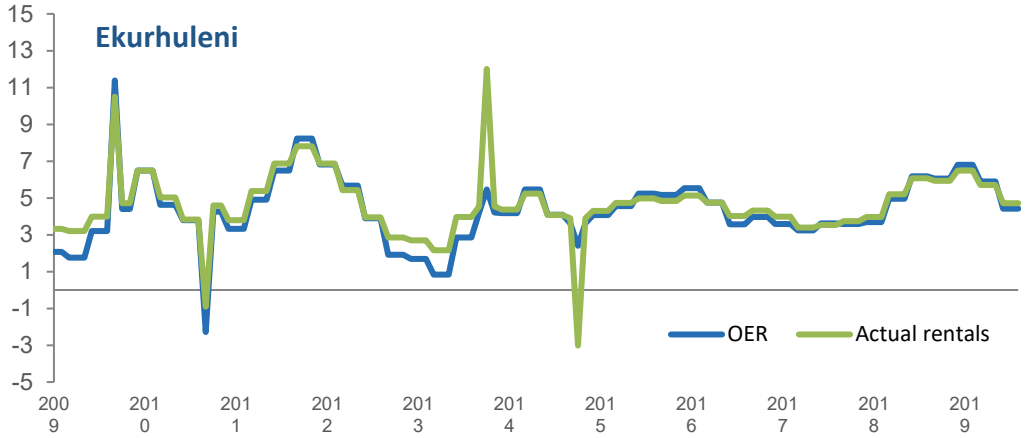

Figure 1.23 OER versus actual rentals Ekhurleni

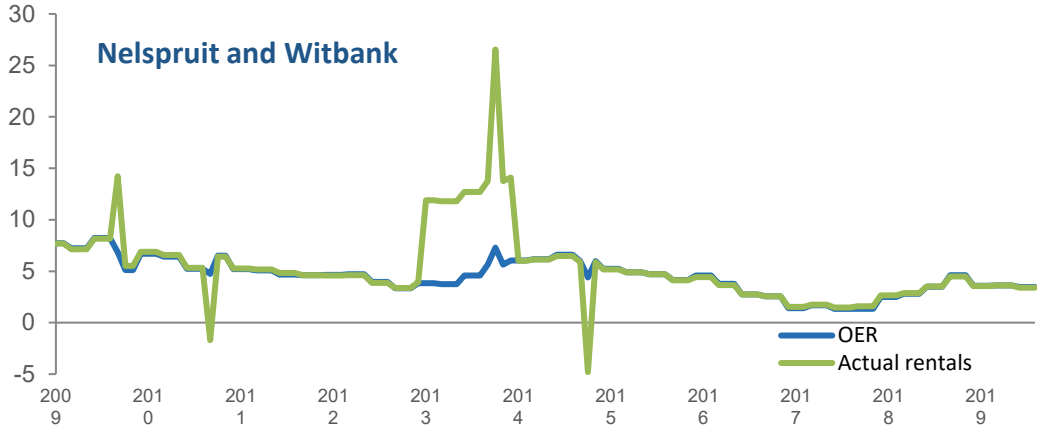

Figure 1.24 OER versus actual rentals Nelspruit and Witbank

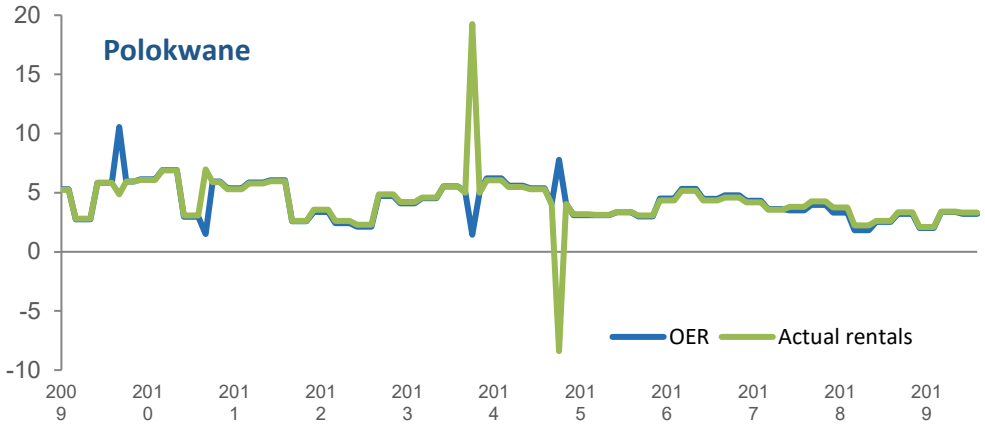

Figure 1.25 OER versus actual rentals in Polokwane

4.3.2 Secondary areas

Figure 1.26 to Figures 1.33 reflects actual rentals and OER of secondary areas. These results differ slightly from the primary areas in that actual rentals, and OER were in most cases on the same trajectory with a few peaks and troughs. From September 2008 to September 2009, Ermelo and Secunda and Newcastle areas had the highest increases in housing costs. Ermelo and Secunda's increases were from both OER (22,19%) and actual rentals (17,49%) as well as Newcastle with OER (20,35%) and actual rentals (17,20%). The increase in Ermelo and Secunda's housing cost was due to demand and supply and accompanied the same reasons as explained for the Nelspruit and Witbank area as both the primary and secondary area falls within the Mpumalanga province. The housing cost increase experienced in Newcastle was also attributed to increased demand seeing as the area is famous for many coal mines and major industrial organisations attracting numerous job seekers. From September 2009 to September 2010 both Ermelo and Secunda and Newcastle experienced the highest declines in housing costs on both actual rentals and OER. These declines were again due to the stabilisation of the market after the recession. The one data point that stood out was that of Bethlehem and Kroonstad, with an average increase of (36%) from December 2016 to November 2017. The increase was not affected by economic or demographic reasons but rather a change in the sample of dwelling type. Before December 2016, the sample only included houses; however, this changed with the introduction of flats and townhouses into the sample. Tzaneen was the only secondary area that saw an average increase in housing costs of (12,80%) year on year from January 2013 up to December 2013, these increases were from actual rentals alone and according to (Payprop 2014), was again due to lack of rental stock due to the booms in these smaller towns and the continued instability in the construction sector.

When looking at the results of De Aar and Kuruman, this secondary area had the largest consecutive drop in housing costs from June 2016 to August 2017. The reason for the decline was not that housing costs are on a downward trend but rather that many migrants who initially flocked to this area have had

to move away. Kathu is an area just 45 minutes away from Kuruman and home to the Sishen mine, Khumba's iron ore plant. From 2011 up to 2013 the mining operations at this mine was at a peak as iron ore prices soared while the company's employee share scheme, paid out lump sums to the value of R500 000 to every employee involved in the scheme totalling around R2.7 billion (Mail and Guardian 2016). With this income and wealth, demand increased in all sectors. New cars came into the area by the hundreds, and many shops floors were often left empty, especially furniture stores like Joshua Doore. The construction of two new malls took place, and many employees invested their new wealth on property by building a new property and extending existing ones. With this buying power inflation rose very fast, the price of goods and services increased together with an increase in property values and costs of rentals. The major crises for the area were, however, when the Chinese demand for iron ore dropped, which led to iron ore prices to decline drastically. In 2011 the price of ore was $187 a tonne and by December 2015 dropped to $40 a tonne. As the town faced this downturn, many car dealerships and furniture shops like Joshua Doore had to close their franchises. Retrenchment hit the community, significantly causing people to move to other provinces to obtain job opportunities. As indicated in the literature, according to (Larking et al 2018), out-migration causes a decline in house prices or lower housing costs as an area becomes less desirable. As mentioned by (Das et al 2011), bubbles in the housing market refer to increases in prices beyond a sustainable level and these bubbles should be of concern to government and monetary. Should these institutions ignore the bubbles in specific areas or housing markets, the result will be a situation like that of De Aar and Kuruman where a once-thriving town is now merely a small town hidden away on a map of South Africa. Although the newfound wealth awarded to the employees of Sishen mine affected consumer spending patterns, inflation and house prices drastically, it is essential to bear in mind (Aoki et al 2001), findings that in reality, wealth is and house prices are not enough to explain historical trends between consumer spending and house prices.

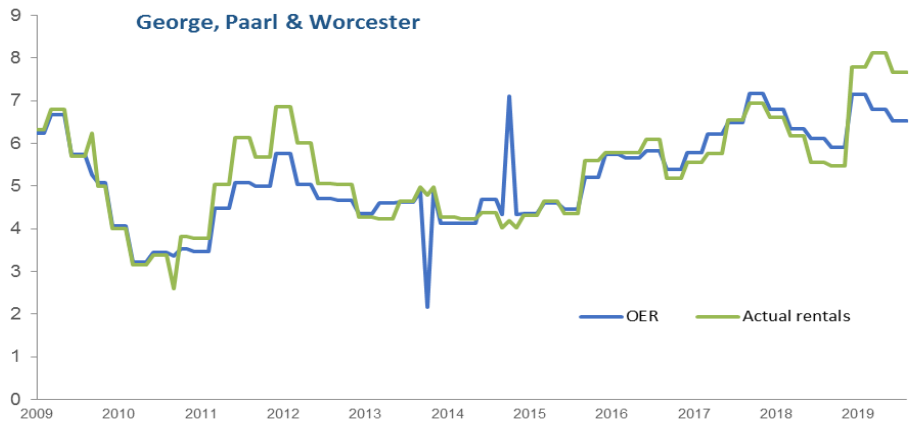

Figure 1.26 OER versus actual rentals George, Paarl and Worcester

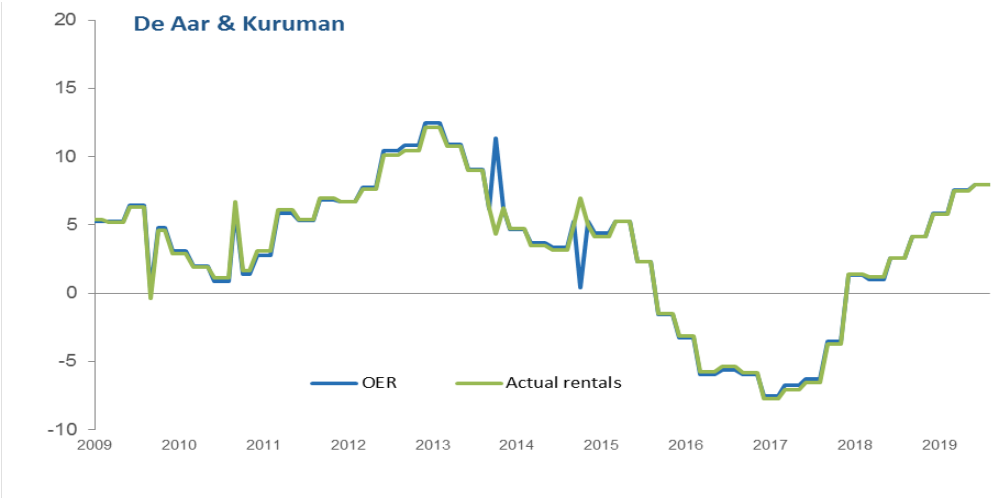

Figure 1.27 OER versus actual rentals De Aar and Kuruman

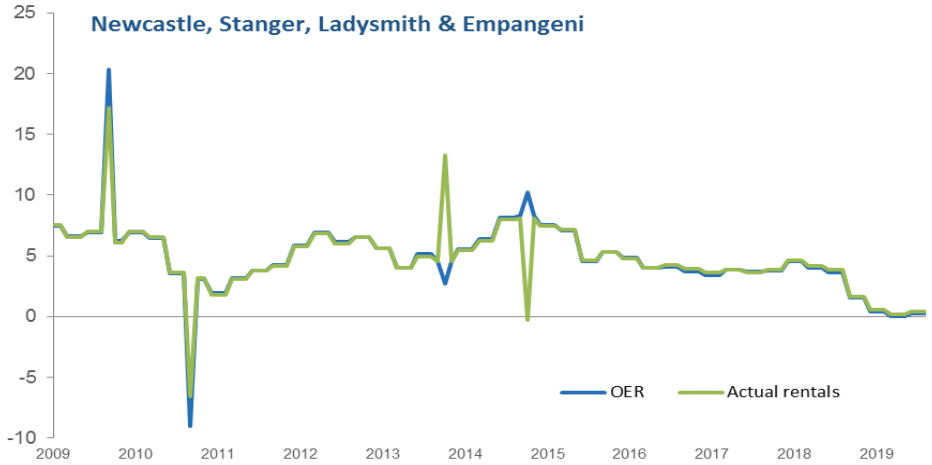

Figure 1.28 OER versus actual rentals Newcastle, Stanger, Ladysmith and Empangeni

Figure 1.29 OER versus actual rentals Bethlehem and Kroonstad

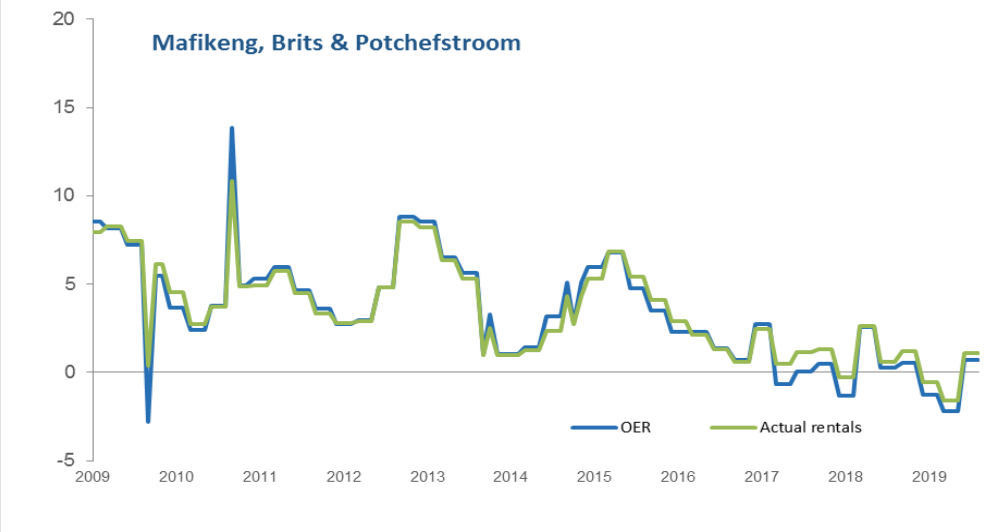

Figure 1.30 OER versus actual rentals Mafikeng, Brits and Potchefstroom

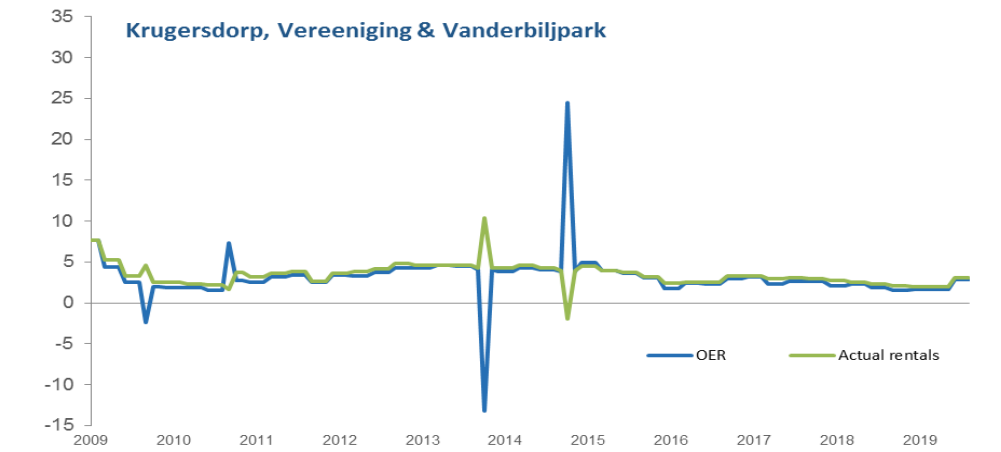

Figure 1.31 OER versus actual rentals Krugersdorp, Vereeniging and Vanderbiljpark

Figure 1.32 OER versus actual rentals Ermelo and Secunda

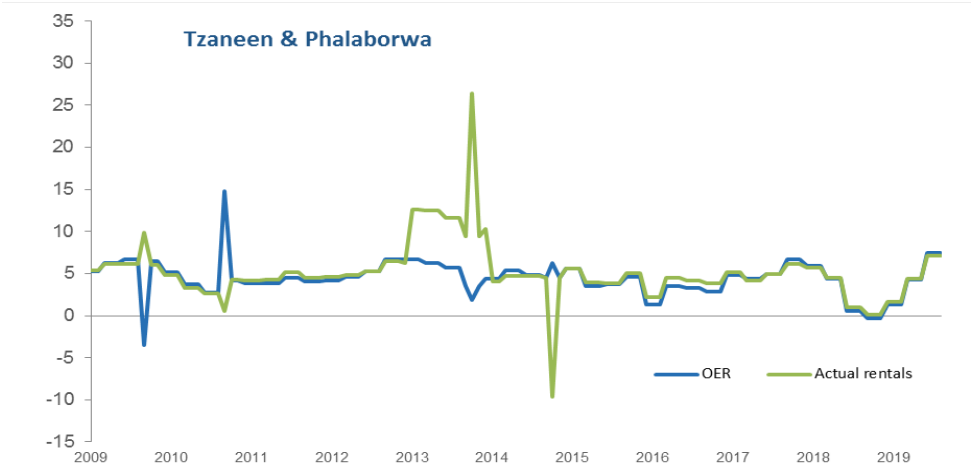

Figure 1.33 OER versus actual rentals Tzaneen and Phalaborwa

4.3.1 Conclusion

When analysing housing costs in more detail in each area, the main contributing factor for the increase in housing costs stems from demand and supply. Significant changes in housing costs are, however, attributed to booms and recessions experienced in the housing market. New operations in areas have a further impact on housing costs, causing an influx of migrants, escalating demand for housing, placing immense pressure on limited supply. The consequence is rising costs of housing, with increases in inflation and housing costs, are that households are placed in vulnerable positions often having to sacrifice spending on essential items to meet the cost of housing. The analysis saw that in areas like Bloemfontein where there was a new residential development, Westlake, house prices increased as houses were offered at a premium making it only affordable to a selected few based on income levels. Further, it was seen that out-migration causes a decline in housing costs and more especially makes an area less desirable due to lack of activity in a specific area. Overall, various factors that act together to affect the cost of housing, whereas income remains constant for more extended periods compared to escalating housing costs.

4.4 Housing costs, assessment rates and sectional title levies

Table 1.4 and Table 1.5 indicates the correlation coefficients for housing costs (independent variable) and assessment rates (dependent variable) across the primary and secondary areas in South Africa. Table 1.6 explains the different correlation relationships that exist between the two variables. The correlation between housing costs and assessment rates indicates that as one variable changes in value, the other variable changes in a specific direction. The higher the absolute value, the stronger the relationship is between variables. A strong positive correlation presents itself in Bloemfontein and Welkom and

Bethlehem and Kroonstad indicating that as the cost of housing increases, assessment rates increases and as the cost of housing decreases, assessment rates decrease. The average increase in housing cost in Bethlehem and Kroonstad for 2017 was (16,64%), contributing to the strong positive correlation. As indicated during the analysis of actual rentals and OER in secondary areas, the increase was not affected by economic or demographic reasons but rather a change in the sample of dwelling type. Before December 2016, the sample only included houses; however, this changed with the introduction of flats and townhouses into the sample. When both variables change in the same direction, an upward slope is presented on a scatter plot, and when both variables change in the opposite direction, a downward slope presents itself on a scatterplot.

Table 1.4 Correlation coefficients of primary areas

	Cape Peninsula	Port Elizabeth	East London	Kimberly	Bloemfontein and Welkom	Durban and Pinetown	Pietermari-tzburg	Rustenburg	Tshwane	City of Johannesburg	Ekurhuleni	Nelspruit and Witbank	Polokwane
Housing cost and assessment rates	-0,485	-0,547	0,270	0,184	0,693	0,356	0,000	-0,796	0,469	-0,640	0,228	-0,029	-0,485

Table 1.5 Correlation coefficients of secondary areas

	George, Paarl and Worcester	Queenstown, Grahamstown and Port Alfred	De Aar and Kuruman	Bethlehem and Kroonstad	Newcastle, Stanger, Ladysmith and Empangeni	Mafikeng, Brits and Potchefstroom	Krugersdorp, Vereeniging and Vanderbiljpark	Ermelo and Secunda	Tzaneen and Phalaborwa
Housing cost and assessment rates	-0,547	0,270	0,184	0,693	0,356	0,000	-0,796	0,469	-0,640

Table 1.6 Correlation relationship between primary and secondary areas

	Strong negative linear relationship (-0.7)	**Moderate negative linear relationship (-0.5)**	**No linear relationship (0)**	**Strong positive linear relationship (+0.7)**	**Moderate positive linear relationship (+0.5)**	**Weak positive linear relationship (+0.3)**	**Absence of correlation (0 to +0.25 or 0 to -0.25)**
Primary Area	Rustenburg	Cape Peninsula	Pietermaritzburg	Bloemfontein and Welkom	Tshwane	East London	Kimberly
		Port Elizabeth				Durban and Pinetown	Ekurhuleni
		City of Johannesburg					Nelspruit and Witbank
		Polokwane					
Secondary Area	Krugersdorp, Vereeniging and Vanderbiljpark	George, Paarl and Worcester	Mafikeng, Brits and Potchefstroom	Bethlehem and Kroonstad	Ermelo and Secunda	Queenstown, Grahamstown and Port Alfred	De Aar and Kuruman
		Tzaneen and Phalaborwa				Newcastle, Stanger, Ladysmith and Empangeni	

Figure 1.34 presents the scatter plot distribution for housing costs, assessment rates and sectional title levies for all primary and secondary areas. A strong negative linear correlation exists in Rustenburg and Krugersdorp, Vereeniging and Vanderbiljpark, indicating when the cost of housing increases, assessment rates decreases, and when the cost of housing decreases, assessment rates increase. Most areas present a moderate negative relationship between the two variables comprising of four primaries, of which three falls under the classification as metropolitan areas and two secondary areas indication as housing costs increase, assessment rates decrease at a moderate rate. Pietermaritzburg and Mafikeng, Brits and Potchefstroom with a correlation coefficient of 0 indicate that there no linear relationship is present with no tendency in the dependent variable to increase or decrease. Four areas present coefficients between 0 to +0.5 and 0 to -0.5 indicating the absence of any correlation, refer to Figure 1.34 for scatter plot distributions in these areas.

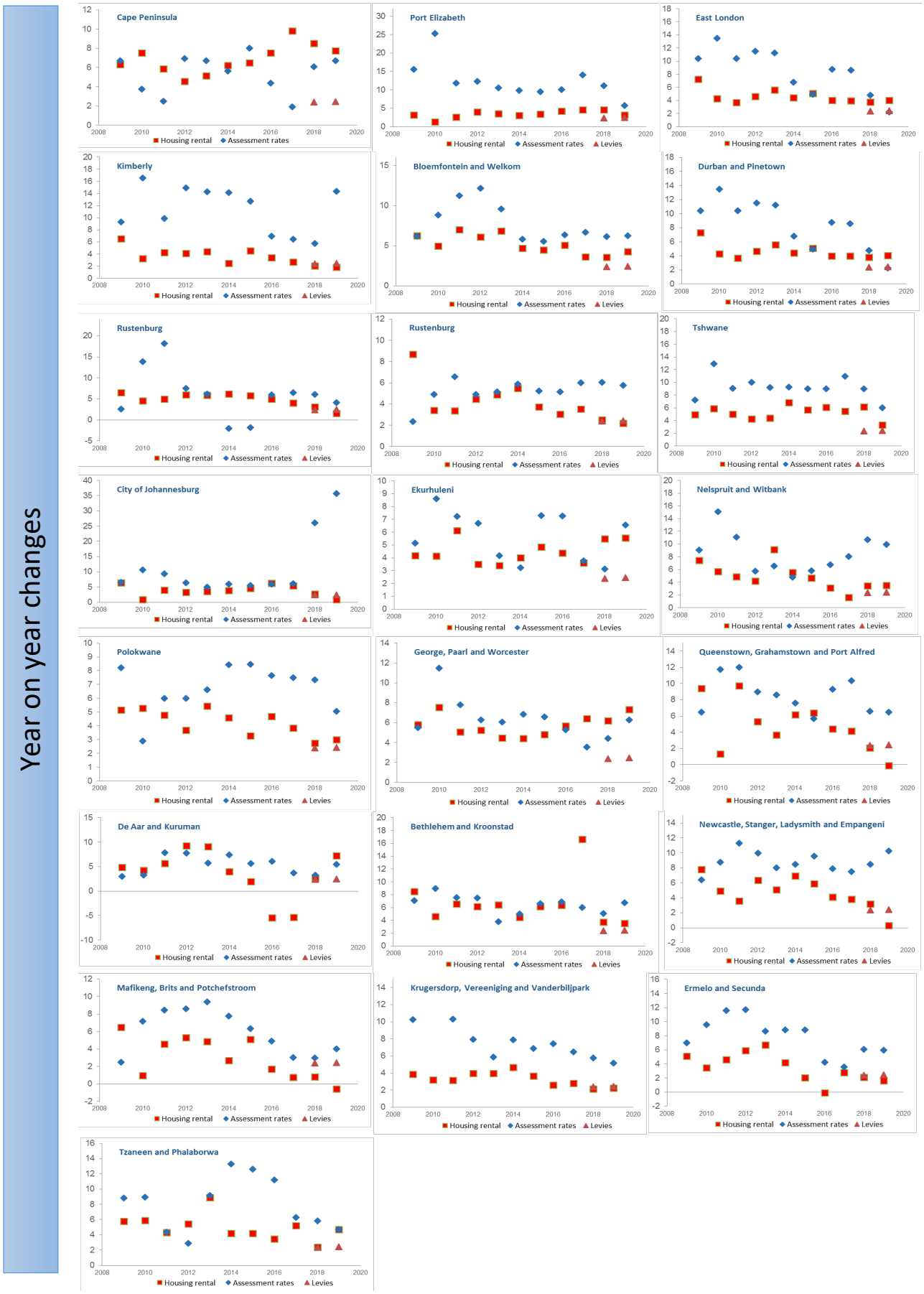

Figure 1.34 Housing cost and assessment rates scatter plot

4.5 The supply of housing in South Africa

Supply elasticities in housing are essential in determining and explaining the current patterns and trends that shape the urban development of cities (Saiz 2010). There is a variation of supply elasticities across different areas as identified by (Glaeser et al 2005), due to costs of construction, increasing price of land and governing barriers to new construction all of which affect house price inflation. The growing insufficient supply poses a problem for private and public sector developers to deliver affordable housing and fill the gap between demand and supply (Coetzee 2018). Figure 1.35 and figure 1.36 based on the Building Statistics Survey by Statistics South Africa reflects the results of the building plans completed for all metropolitan areas from 2010 to 2018 in terms of the number of units completed and Rand value completed. The building plans completed is based on data collected by buildings financed by private sector developers who focus on the middle to the higher end of the residential market. Development by dwelling type specifically; houses, flats and townhouses are monitored according to the different metropolitan areas. From the results, it is clear that three of the eight metros dominate in terms of urban development and housing supply, namely; the City of Cape Town, Tshwane and Johannesburg. The City of Cape Town leads in construction, producing the highest number of houses (60 839) and flats (23 253) as well as the highest Rand value of houses (R30 181 583) and flats (R13 366 140) compared to all other metros (Stats SA 2019c pp. 3-4). With Cape Town leading in the construction of houses, the indication is that the city is focusing on freehold titles which are overly expensive and contributes to the urban sprawl within areas (Coetzee 2018), the focus should instead be on the development of higher-density units. The City of Tshwane follows, producing the second-highest number of houses (31 976) and flats (10 351) as well as the second-highest Rand value of houses (R37 087 377) and flats (R7 639 515) (Stats SA 2019c pp. 3-4). Although the City of Tshwane is second to the City of Cape Town in the number of units of houses and flats constructed, the City of Cape Town has almost double the number of units constructed. The City of Tshwane's value of houses constructed was (18,62%) higher than that of the City of Cape Town (Stats SA 2019c pp. 3-4). This difference in value as identified by (Dzangmah 2012), could be an indication of lower development costs, making housing affordability more favourable to the middle to low-income earners as these earners are affected by the minimum price levels set out by housing developers in the City of Cape Town as opposed to Tshwane. The City of Tshwane is the leader in development of the number of townhouses constructed with a total of number (13 160) townhouses at a Rand value of (R11 846 478); however, the City of Johannesburg is at the forefront in terms of Rand value development of townhouses showing that this metro offers much higher valued properties, most likely in more elite areas where development occurs (Stats SA 2019c pp. 3-4).

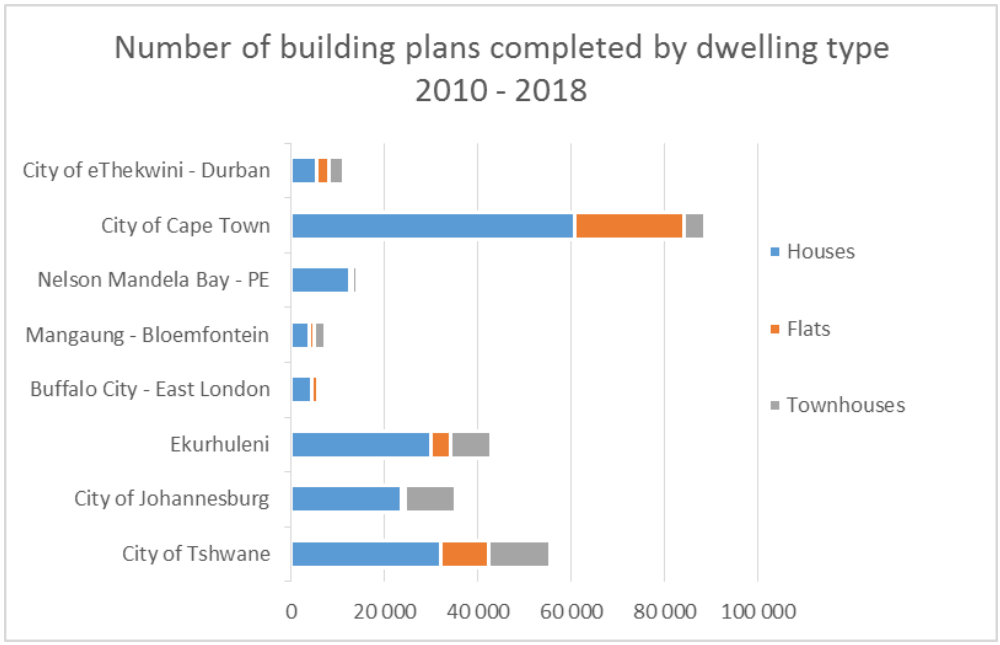

Figure 1.35 Housing supply per metropolitan area by the number of units completed

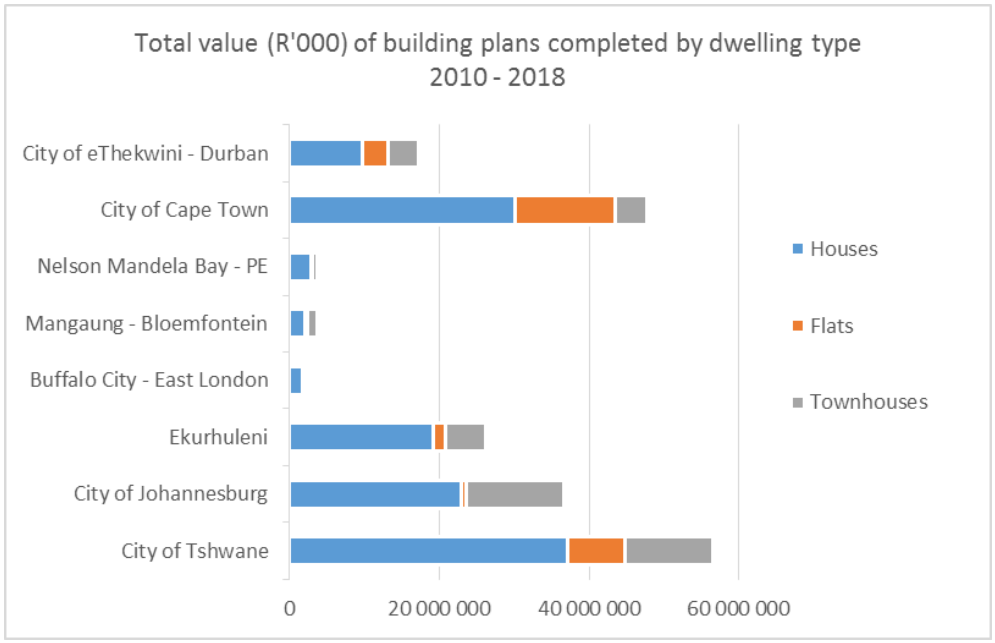

Figure 1.36 Housing supply per metropolitan area by Rand value completed

4.5.1 Conclusion

Construction costs have risen considerably over the past few years following the increase of the overall CPI inflation (Coetzee 2018). Housing supply and affordability follow this concurrent increase adding pressure to both developers and households demanding housing. Based on the analysis of the various primary and secondary areas, one factor that stood out when tracking the rental inflation in these areas was the issue of demand and supply. Higher inflation rates were predominantly present in areas where

supply should not meet demand, pushing up housing prices and placing pressure on households in terms of affordability. Government's inability to meet the demand for housing that is affordable leads to low-income people moving into or living in decaying informal settlements and inner-city neighbourhoods (Harrison 2003). In order to ease supply issues, the focus should be placed on higher-density housing units as freehold units come in as overly expensive, adding to the urban sprawl of cities. To curb high construction costs developers should look at alternative materials in construction, rather than concrete and cement; new avenues should be explored without compromising quality.

4.6 Core analysis

All analysis taken up to this point of the study was primarily based on the CPI time series data from January 2009 to August 2019. The core analysis that follows, however, is based on the LCS data collected from October 2014 to October 2015 as this data encompasses the latest income information not available on the CPI flat form. To accurately match this income data, the analysis uses the expenditure and housing (rentals) captured for the same period from the LCS survey rather than CPI data.

4.6.1 Relationship between the log of income on housing costs

Figure 1.37 shows the relationship of the log of income on housing costs, combined for all areas at an aggregate level and figure 1.38 shows the same relationship per primary and secondary area. Log income is used as a log transformation which allows the study to more clearly depict a change in housing cost as income increases or decreases. Results show that as income increases, the share of income spent on housing cost decreases for nearly all primary and secondary areas. There are, however, some areas that do not feed the trend appropriately refer to Figure 1.38 Rustenburg and Polokwane. These areas have fewer observations when compared to other areas and could entail a sampling bias and sampling error. An example of sampling error or sampling bias could arise from data being collected from only rich or poor households or data being incorrectly captured by the data collector.

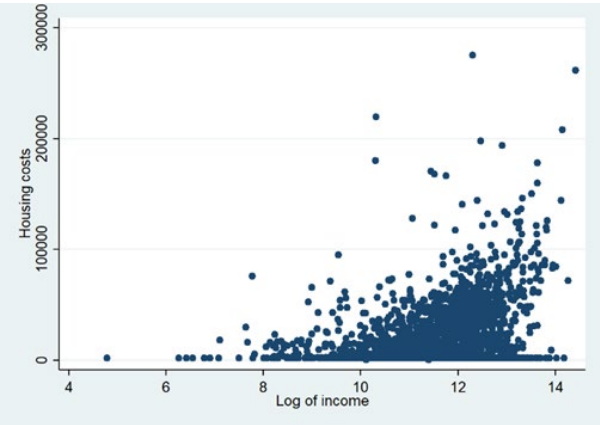

Figure 1.37 Relationship between the log of income and housing cost at an aggregate level

Figure 1.38 Relationship between the log of income and housing cost by primary and secondary area

4.6.2 Relationship between the share of income spent on housing as income changes

Figure 1.39 and figure 1.40 describes the relationship between the share of income spent on housing as income changes (log-scaled). Figure 1.39 describes this relationship at an aggregate level and figure 1.40 breaks the analysis by primary and secondary area. The figures show that at low levels of income, a greater share of income is spent on housing costs. As income increases, the share of income spent on housing decreases. This relationship holds for a majority of our focus area, regardless of the are being primary or secondary and is a direct indication of the affordability issue at lower levels which could result in households at lower levels of income being unable to save adequately and further, their disposable income is kept at low levels. As indicated in the literature by (Dustmann et al 2018), individuals at the bottom end of income distribution often find that their share of income spent on housing as a necessity good is further amplified by declining income. With the middle to high-income earners, as their incomes increase, there is no significant increase in their housing costs, allowing these households to be in a better position to save and have more disposable income available to them.

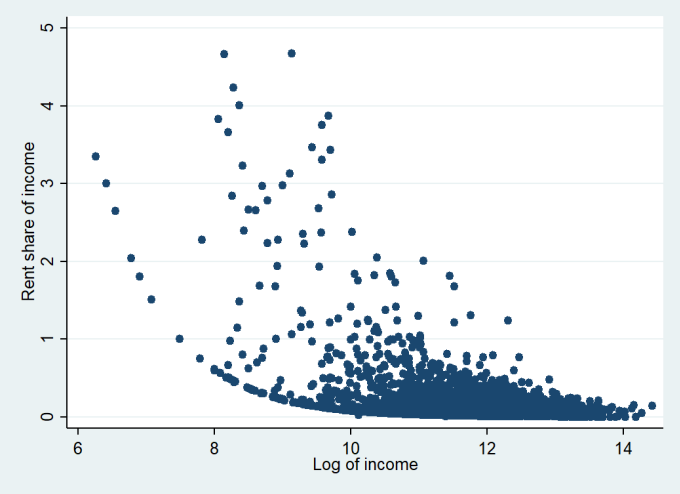

Figure 1.39 Relationship of the share of income spent on housing at an aggregate level

Figure 1.40 Relationship of the share of income spent on housing by primary and secondary area

4.6.3 Relationship between age of head of household and housing costs

Figure 1.41 shows the relationship between the age of the head from 20 to 50 years and older and housing costs at an aggregate level. Figure 1.42 shows the breakdown per primary and secondary area. Findings show that between the age of 20 and 50 housing costs are high and increases occur as the age of the head get older, however from 50 years and older, housing costs start to decrease. This decrease can attributes to the life stage cycle and the lifestyle events that individuals or households have to go through. Often the older and retired tend to downsize, and their housing needs changes. Relocation occurs out from larger homes into smaller homes, with this accompanies lower costs associated with maintenance on the property and the expense on utilities are lowered. Overall this group entails lower housing costs when compared to the ages from 20 to 50.

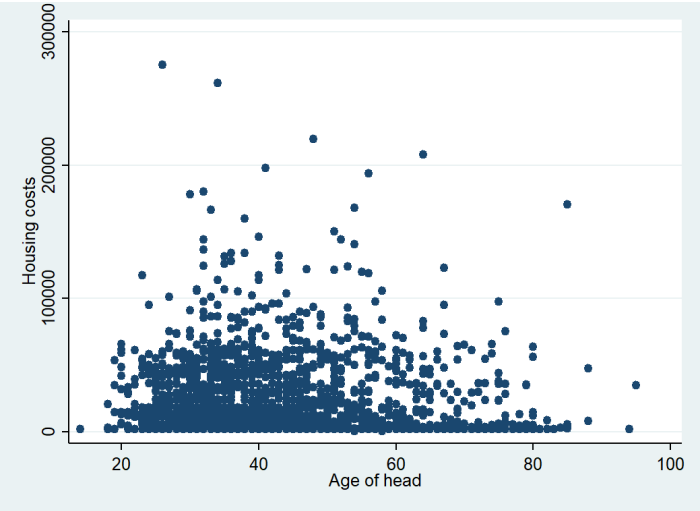

Figure 1.41 Relationship between the age of head and housing costs at an aggregate level

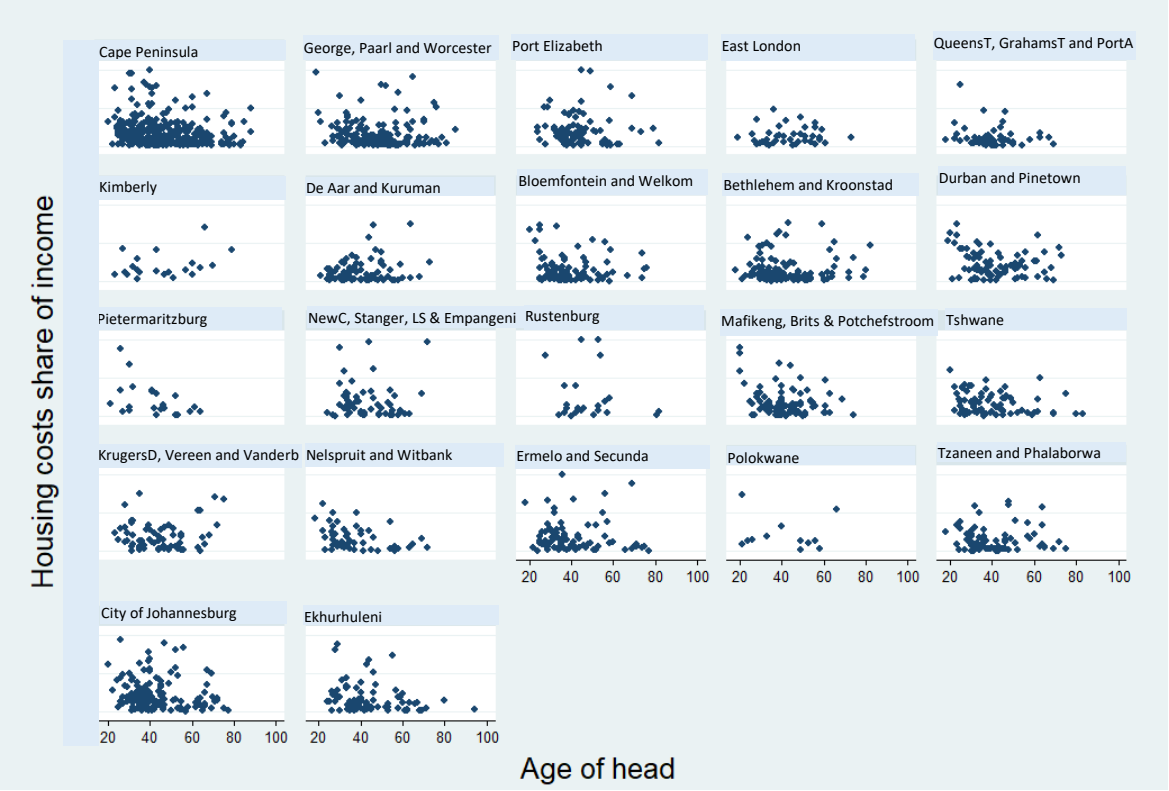

Figure 1.42 Relationship between the age of head and housing costs by primary and secondary area

4.6.4 Average housing cost by males and females per primary and secondary area

Table 1.7 shows the average housing cost paid per primary and secondary area between males and females. The table provides an overall view of the difference between housing costs paid by sex, showing that that males on average pay more for housing than females. The reason for this which is not reflected in the table is that on average males earn more than females resulting in males paying more on average than females for housing. Later in the analysis, we look at the average housing costs paid between males and females compared by different quintiles to compare people in the same income categories; the results differ. In Polokwane, Queenstown, Grahamstown and Port Alfred, there is a significant difference between male and female share on housing costs with males paying more than double for housing than females. Mafikeng, Brits and Potchefstroom is the only area in which income from females is higher than that of males.

Table 1.7 Average housing cost by sex

	Area	Female	Male	Total
Primary Areas	Cape Peninsula	23480,522	35403,085	30841,409
	Port Elizabeth	28849,982	30281,301	29814,916
	East London	9405,6573	13464,621	11765,52
	Kimberly	24187,82	32636,483	30432,484
	Bloemfontein and Welkom	17877,92	22152,1	20593,805
	Durban and Pinetown	23450,811	31743,269	29575,922
	Pietermaritzburg	3503,3411	20569,704	14169,818
	Rustenburg	11915,497	22793,614	20980,594
	Tshwane	26441,781	36389,936	33382,355
	City of Johannesburg	31432,577	34963,575	33771,863
	Ekurhuleni	13888,111	22670,744	20100,217
	Nelspruit and Witbank	10637,361	21443,131	18476,841
	Polokwane	1828,79	30468,75	28082,087
Secondary Areas	George, Paarl and Worcester	12225,716	25410,65	19657,224
	Queenstown, Grahamstown and Port Alfred	5169,64	12862,203	9814,2064
	De Aar and Kuruman	12643,397	14773,831	14039,199
	Bethlehem and Kroonstad	7198,709	9245,7917	8537,922
	Newcastle, Stanger, Ladysmith and Empangeni	21833,136	17464,988	19503,457
	Mafikeng, Brits and Potchefstroom	26374,4	20756,644	22770,557
	Krugersdorp, Vereeniging and Vanderbiljpark	23435,342	24616,11	24483,066
	Ermelo and Secunda	11653,107	24886,886	20690,81
	Tzaneen and Phalaborwa	12721,583	20284,4	18279,798

4.6.5 Multiple regression results overall

The following interpretation is based on the multiple regression results in Table 1.8, where dummy variables per primary and secondary were created with Cape Peninsula taken as the baseline dummy variable. Analysis of all other areas occurred relative to Cape Peninsula. Correlation coefficients are calculated as a number between -1 and 1, with -1 indicating a strong negative correlation and 1 indicating a strong positive correlation between variables. When interpreting the p-value, a small p-value ($\leq$0.05) provides strong evidence on rejecting the null hypothesis, and a large p-value (>0.05) provides weak evidence against the null hypothesis, so the study fails to reject the null hypothesis.

Age of head holds a significant negative relationship; however, has a weak effect on the share of income spent on housing. As the age of the head increases, the share of income on housing decreases by a minimal amount each year. Intuitively, the decrease makes sense, since, as one gets older, houses generally get paid off, and older people who rent would be smaller in number than older people who own houses. As identified in the literature by (Harvard University 2013), younger people are more inclined to renting than older people or older households. Young adults are usually the age group likely to rent due to the flexibility that the rental market offers, lower transaction costs and a natural choice being a student or having the ability to change jobs, this flexibility that renting accompanies is ideal.

The result is almost four out of five young adults under the age of 25, two-thirds of adults between the age of 25-29 and more than half of the households within their early 30s opt for rental rather than buying (Harvard University 2013). Age squared was included in this study as a variable to capture any non-linear elements in a relationship.

Table 1.8 Regression results

Source	SS	df	MS		
Model	7.58651884	30	.252883961	Number of obs	= 1,840
Residual	55.106694	1,809	.030462517	F(30, 1809)	= 8.30
				Prob > F	= 0.0000
				R-squared	= 0.1210
				Adj R-squared	= 0.1064
Total	62.6932129	1,839	.034090926	Root MSE	= .17454

rent_hh_income	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Age_of_head	-.0069083	.0017901	-3.86	0.000	-.0104192	-.0033974
agesq	.0000536	.0000183	2.93	0.003	.0000177	.0000895
gender	.1038209	.0231652	4.48	0.000	.0583875	.1492543
income	-1.66e-07	2.95e-08	-5.62	0.000	-2.24e-07	-1.08e-07
gen_sec	-.0128532	.0177583	-0.72	0.469	-.0476822	.0219758
George_Paarl_Worcester	-.0287546	.0197526	-1.46	0.146	-.0674949	.0099857
Port_Elizabeth	.027221	.0212061	1.28	0.199	-.0143699	.068812
East_London	-.0818243	.0287322	-2.85	0.004	-.1381761	-.0254725
Queenstown_Grahamstown_PortAlf	-.0863773	.0282137	-3.06	0.002	-.1417122	-.0310425
Kimberly	.0215901	.0385071	0.56	0.575	-.053933	.0971132
DeAar_Kuruman	-.0559069	.0248072	-2.25	0.024	-.1045606	-.0072532
Bloemfontein_Welkom	-.0419075	.0208561	-2.01	0.045	-.0828121	-.0010028
Bethlehem_Krronstad	-.0462208	.0227343	-2.03	0.042	-.090809	-.0016326
Durban_Pinetown	.0313787	.0218926	1.43	0.152	-.0115588	.0743162
Pietermartizburg	-.0098818	.0378794	-0.26	0.794	-.0841738	.0644102
NewC_Stanger_Ladysmith_Empangeni	.0084091	.0268124	0.31	0.754	-.0441775	.0609957
Rustenburg	.0420028	.0371621	1.13	0.259	-.0308824	.114888
Mafikeng_Brits_Potchefstroom	-.0000329	.0237488	-0.00	0.999	-.0466108	.0465451
Tshwane	-.0311845	.0218785	-1.43	0.154	-.0740944	.0117253
Krugersdorp_Vereeniging_VanderB	.0129158	.0275041	0.47	0.639	-.0410273	.0668588
Nelspruit_Witbank	-.0361065	.0269038	-1.34	0.180	-.0888723	.0166593
Ermelo_Secunda	-.000488	.0247762	-0.02	0.984	-.049081	.048105
Polokwane	.0108817	.0514693	0.21	0.833	-.0900639	.1118273
Tzaneen_Phalaborwa	-.0285122	.0256198	-1.11	0.266	-.0787598	.0217354
Johannesburg	.0346289	.0174525	1.98	0.047	.0003998	.068858
Ekurhuleni	-.0196217	.021903	-0.90	0.370	-.0625794	.0233361
genq2	-.0771632	.0254052	-3.04	0.002	-.1269897	-.0273367
genq3	-.1011378	.0238772	-4.24	0.000	-.1479676	-.054308
genq4	-.1205621	.0223775	-5.39	0.000	-.1644505	-.0766736
genq5	-.1320674	.0244971	-5.39	0.000	-.180113	-.0840217
_cons	.4134288	.0428031	9.66	0.000	.3294801	.4973775

A strong positive, statistically significant correlation exists between gender and the share of income spent on housing. The gender variable of males was the baseline variable used. Quintile one reflects those households with the highest income, and as identified earlier, men earn more than women; therefore, it is understandable why males in this quintile pay more for housing than women, the gap between coefficients here is therefore large. Figure 1.43 shows the difference in the gap between the male and female share of income spent on housing. As income increases, both male and female share of housing spend over income decreases, and the gap between female spend of income and male spend of income decreases progressively. In quintile four, the female spend on housing as a share of income becomes larger than the male spend, and the difference between the spend grows in quartile five. This difference reflects in variables genq2 – genq5, which are dummy variables that are all significant.

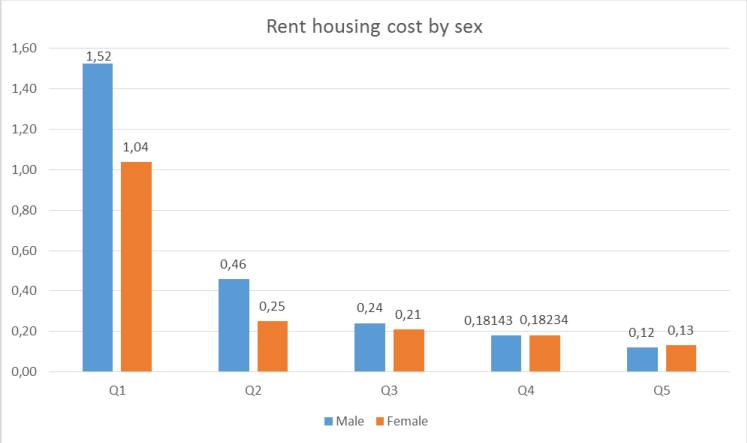

Figure 1.43 Average housing cost by sex

Gen_sec is an interaction term included in the regression to test the impact of differences in the share of income spent on housing across primary and secondary areas by gender. This term was not found to be significant, probably because these effects capture in the sex*quintile 2-5.

4.6.6 Conclusion

Income holds a strong statistically significant negative relationship, with a small variance in the spread indicating that the majority of households follows the same relationship, as income increases the share of income spent on housing decreases. The literature, according to (Albouy et al 2016), also stated that the increasing expenditure share on housing and housing costs should have been on a decrease as the average income of households increased over time. This research hypothesises that there is an inverse or negative correlation between housing costs (independent variable) and household income (dependent variable), as property costs increase, disposable household income decreases, therefore the results of the analysis provides the evidence that this research hypothesis is correct and valid.

CHAPTER 5: CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5. CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 Introduction

This section will give a conclusion based on the observations of the study. It will first summarise the findings of each analysis undertaken for the various variables and conclude with the implications of these findings, policy recommendations, potential shortcomings of the research and further studies, and the value and contribution of this research.

5.2 Summary and conclusions

This research study set out to determine how rental expenditure differs across various primary and secondary areas the correlation between sectional title levies and housing costs, the correlation between assessment rates and housing costs and housing costs by different dwelling types across the selected areas. The research hypothesised that there is an inverse or negative correlation between housing costs (independent variable) and household income (dependent variable), as property costs increase, disposable household income decreases. Additionally, the hypothesis expects that the underlying reason for high housing costs and increasing rental inflation is a lack of supply of housing to meet the growing demand. Based on the above after analysis, the following outcomes were established.

When analysing the rental importance by dwelling type, results show that OER in South Africa is an important aspect when determining ownership of property. Houses are the dominant dwelling type for South African's as more people choose to live in houses compared to flats and townhouses. However, growing demand for townhouses exists more, especially in the metros indicating that the metros are continuously growing and with that demand is on the increase.

When analysing housing costs in more detail in each area, the main contributing factor for the increase in housing costs stems from demand and supply. Further, it was seen that out-migration causes a decline in housing costs and more especially makes an area less desirable due to lack of activity in a specific area. Overall, various factors that act together to affect the cost of housing, whereas income remains constant for more extended periods compared to escalating housing costs.

Analysis of housing costs and assessment rates show that assessment rates are quite responsive to changes in housing costs. The correlation that exists between housing costs and assessment rates varies according to each primary and secondary area. Moderate correlation can be found in three of the big metros; Cape Town, Johannesburg and Port Elizabeth indicating that a change in housing cost does not have a huge impact in the change on assessment rates.

Based on the analysis of the various primary and secondary areas, one factor that stood out when tracking the rental inflation in these areas was the issue of demand and supply. Higher inflation rates were predominantly present in areas where supply should not meet demand, pushing up housing prices and placing pressure on households in terms of affordability.

Income holds a strong statistically significant negative relationship, with a small variance in the spread indicating that the majority of households follows the same relationship, as income increases the share of income spent on housing decreases. Results from the regression prove the hypothesis set for the study showing that overall as household income increases, housing costs decrease.

5.3 Limitations of the study

For the use of primary and secondary areas in the study, in majority cases, primary areas of a province are indicated and reflected by one town or city, and in the case of secondary areas, a grouping of towns or cities occurred to form one secondary area. The grouping of towns and cities was due to budget constraints by Statistics South Africa. With limited financial resources, the selection of towns was based on those towns close to a provincial statistics office. Staff from provincial offices had to travel to neighbouring towns to gather data; the data then was sent to head office for processing. Adding towns far from provincial offices was not feasible taken into consideration the cost of travel to these towns and the workload placed on staff as most provincial offices have limited staff. For the regression analysis, LCS data was used which did not follow the same area selection criteria of the CPI as above as the LCS survey sample was designed for provincial estimates so sub-provincial estimates cannot be accurately relied upon for any statistical modelling or inferences.

When looking at houses flats and townhouses in CPI, it needs to be understood that large scale adjustments occurred to the housing data received from the LCS. And not only that almost all other Classification of Individual Consumption According to Purpose (COICOP) categories were adjusted in order to tie in with real-world data. Food expenditure from retailers, customs and excise duties and ad valorem taxes for cigarettes, alcohol and tobacco, medical aid data from the council for medical schemes are examples. Therefore the CPI weights will be different from LCS weights and LCS income data.

The limitation with the income variable collected by the LCS. The collection of the income variable is very problematic, which had an effect on the data and analysis that comes with it. Often respondents refuse to answer the question on income and some respondent’s under-report their income levels. During data analysis for this study, some areas where missing income information due to the above. Readers of this study should take into consideration the challenges around the collection of income data and the limitation of the no-income reporting.

Time-series analysis of sectional title levies was not possible due to only two years of data being available.

5.4 Recommendations

South Africa requires the development of a House Price Index, which can be applied locally to better understand the dynamics of the housing market in detail at lower levels instead of at a national level. Although the national dataset offers some dynamic insight, municipal data should be tested in order to develop a municipal house price index beneficial to each metro. Reasons as to why a municipal level index would be more beneficial include:

- More accurate management of municipal assessment rates income to allow useful rating of the property values in the area with more robust budget projections and equitable rating of assessment rates
- The identification of potential bubbles in the housing market using a municipal index improving risk assessment capabilities in the housing market
- A more detailed index provides an opportunity for investment publicly and privately by identifying potential opportunities in the municipalities as well as reducing collateral prerequisites
- A municipal index helps to identify areas that require intervention and guidelines for developments needed in the specific area

South Africa should adopt a policy of a mix of tenure type which includes rental housing; long term leases for housing though shared ownership both with equity and without and complete ownership status.

There should be further studies in secondary areas to understand the differential in income and housing expenditure between male and females. Secondary areas show that there are income disparities, and this needs to be further examined.

By analysing the weights attached by dwelling type across the primary and secondary areas, developers are provided with better insight as to what dwelling is structure is needed in a specific area. Developers are now able to cater to this demand focusing on the specific needs of the area makeup, avoiding fruitless expenditure on development that will not be met with adequate demand

6. REFERENCES

Accetturo A, Manaseri F, Mocetti S & Olivieri E 2014. Don't stand so close to me: The urban impact of immigration. *Regional Science and Urban Economics* 45: 45-56.

Albouy D, Ehrlich G & Liu Y 2016. *Housing demand, cost of living inequality, and the affordability crises*, NBER Working Paper Series. Cambridge: National Bureau of Economic Research.

Aoki K, Proudman J & Vlieghe G 2001. Why house prices matter? *Bank of England Quarterly Bulletin* Winter: 460–68.

Banks J & Smith S 2000. *UK household portfolios*. Institute for Fiscal Studies Working Paper Number 00/14. London: Institute for Fiscal Studies.

Baranoff O 2016. Housing affordability and Income Inequality: The Impact of Demographic Characteristics on Housing Prices in San Fransisco. Senior Honors Thesis. Baltimore: Johns Hopkins University, Department of Economics.

Babbie E 2015. *The practice of social research*. 14th ed. Boston: Cengage Learning.

Beall J, Guha-Khasnobis B, & Kanbur R 2012. *Urbanization and development in Asia: Multidimensional perspectives*. New Delhi: Oxford University Press.

Beatty TKM, Larsen ER & Sommervoll DE 2010. Using house prices to estimate the price of housing in the CPI. *Economics Letters* 106: 238-240.

Benito A, Thompson J, Waldron M & Wood R 2006. House Prices and Consumer Spending. *Bank of England Quarterly Bulletin* Summer 46: 142- 54.

Beyer GH 1949. *Farm Housing in the Northeast*. New York: Cornell University Press.

Centre of Urbanism and Built Environment Studies (CUBES) n. d. A guide to sectional title in South Africa [Online]. https://www. wits. ac. za/media/wits-university/faculties-and-schools/-engineering-and-the-built-environment/research entities/cubes/documents/A%20Guide%20to%20Sectional%20Title%20in%20South%20Africa. pdf [Online]. [Accessed 29 August 2019].

Coetzee G 2018. The role of the private sector in providing gap housing in Johannesburg. Master's thesis. Johannesburg: University of Witwatersrand, Faculty of Engineering and the Built Environment.

Das S, Gupta R & Kanda PT 2011. Bubbles in South Africa house prices and their impact on consumption. *Journal of Real Estate Literature* 19: 69-91.

David A, Guilbert N, Hamaguchi N, Higashi Y, Hino H, Leibbrandt M & Shifa M 2018. *Spatial poverty and inequality in South Africa: A municipality level analysis*, SALDRU Working Paper Number 221. Cape Town: SALDRU University of Cape Town.

Dugard J, Clark M, Tissington K & Wilson S 2016. *The right to housing in South Africa*. Foundation for human rights position paper series. Johannesburg: Foundation for Human Rights.

Dustmann C, Fitzenberger B, & Zimmermann M 2018. *Housing expenditures and income inequality*. ZEW-Centre for European Economic Research Discussion Paper 48. Bonn: Institute of Labor Economics.

Dzangmah HT 2012. Prospects and challenges of rental housing in Greater Accra Region. Doctoral dissertation. Zambia: Kwame Nkrumah University of Science and Technology, School of Graduate Studies.

Fin24 2017. Migrants flock to Gauteng, Western Cape [Online]. https://www. fin24. com/Economy/migrants-flock-to-gauteng-western-cape-stats-sa-20170731-2. Accessed 29 August 2019].

Fin24 2019. Why South Africans are selling residential property? [Online]. https://www. fin24. com/Money/Property/why-south-africans-are-selling-residential-property-20190702. [Accessed 13 September 2019].

Glaeser EL; Gyourko J & Saks R 2005. *Why Have Housing Prices Gone Up*, NBER Working Paper 11129. Cambridge: National Bureau of Economic Research.

Maré C & Stillman S 2008. *Housing Markets and Migration: Evidence from New Zealand*, Economic Impacts of Immigration Working Paper Series. Wellington: Department of Labour.

Green HAJ 1964. *Aggregation in economic analysis an introduction survey*. Virginia: Princeton University Press.

Harrison P, Huchzermeyer M & Mayekiso M 2003. *Confronting fragmentation: housing and urban development in a democratising society*. Cape Town: University of Cape Town Press.

Higgins A & Verbrugge R 2014. Recent owners' equivalent rent inflation is probably not a blip

[Online]. https://link-gale-com.ez.

sun.ac.za/apps/doc/A403918542/AONE?u=27uos&sid=AONE&xid=cc3ce433. [Accessed 25

September 2019].

Iacoviello M 2005. House prices, borrowing constraints, and monetary policy in the business cycle. *American Economic Review* 95: 739–64.

Jacobs W 2014. Migration patterns and migrant characteristics in the Western Cape through differential urbanisation lens. Master's thesis. Stellenbosch: Stellenbosch University, Department of Geography and Environmental Studies.

Jeske K & Liu Z 2013. Should the central bank be concerned about housing prices? *Macroeconomic Dynamics* 17: 29-53.

John L (2012). Secondary cities in South Africa: The start of a conversation. South African Cities Network [Online]. http://sacitiesnetwork. co. za/wp-content/uploads/2014/07/secondary_cities_in_south_africa_with_more_detail. pdf. [Accessed 28 September 2019].

Larkin MP, Askarov Z, Doucouliagos C, Dubelaar C, Klona M, Newton J, Stanley TD & Vocino A 2018. *Do House Prices Sink or Ride the Wave of Immigration?*, IZA Discussion Papers 11497. Bonn: Institute of Labor Economics (IZA).

Lutz BF 2008. The connection between house price appreciation and property tax revenues. *National Tax Journal* 61: 555-572.

Maré C & Stillman S 2008. *Housing Markets and Migration: Evidence from New Zealand*, Economic Impacts of Immigration Working Paper Series. Wellington: Department of Labour.

Mail & Guardian 2016. Iron ore takes Kathu from boom to bust in five years [Online]. https://mg.co.za/article/2016-04-28-iron-ore-takes-kathu-from-boom-to-bust-in-five-years. [Accessed 11 October 2019].

Mathebula J, Molokomme M, Jonas S, Nhemachena C 2017. Estimation of household income diversification in South Africa: A case study of three provinces. *South African Journal of Science 113:* 1-9.

McCarthy J & Peach RW 2010. *The Measurement of Rent Inflation*. Staff Report No. 425. Federal Reserve Bank of New York.

Nygaard C 2011. International migration, housing demand and access to homeownership in the UK. *Urban Studies* 48: 2211-2229.

O'Brien D & Scott PS 2012. *Correlation and Regression in Approaches to quantitative research a guide for dissertation students*. Cork Ireland: Oak Tree Press.

Payprop 2014. Payprop Rental Index Annual Market Report 2013. [Online]. https://za.payprop.com/docs/annual_market_report_2013.pdf. [Accessed 11 October 2019].

Polokwane Municipality 2014. *Polokwane Economic Growth and Development Plan 2030 Research Report*. Polokwane: Polokwane Municipality.

Preez MD, Balcilar M, Razak A, Koch SF & Gupta R 2016. House Values and proximity to a landfill in South Africa. *Journal of Real Estate Literature* 24: 133–149.

Rapach DE & Strauss JK 2006. The long-run relationship between consumption and housing wealth in the eighth district states. *Regional Economic Development* 2: 140–47.

Reed HE 2013. Moving across boundaries: Migration in South Africa, 1950–2000. *Demography* 50: 71-95.

Rural Development & Land Reform 2017. *Land Audit Report Phase II: Private land ownership by race, sex and nationality*. Pretoria: Rural Development & Land Reform.

Saiz A 2010. The geographic determinants of housing supply. *The Quarterly Journal of Economics* 125: 1253-1296.

Simkins C & Fonkam A 2018. H*uman settlements and urban land reform.* Helen Suzman Foundation.

Soen D 1979. Habitability, occupant's needs and dwelling satisfaction. *Ekistics* 46: 129-134.

Spandau AMKM 1971. *Income distribution and economic growth in South Africa*. Doctoral thesis. Pretoria: University of South Africa.

Statistics South Africa (Stats SA) 2009. *The South African CPI sources and methods manual*. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2008a. *Housing in the Consumer Price Index*. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2008b. *Rent in the South African CPI: Concepts and trends*. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2012. *Income and Expenditure of Households 2010/2011*. Release number P0100. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2017a. *The South African CPI sources and methods manual*. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2017b. *Living conditions of households in South Africa: An analysis of household expenditure and income data using the LCS 2014/2015.* Release number P0310. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2017c. *General household survey.* Release number P0318. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2018. *Gross Domestic Product, 4th quarter 2018.* Release number P0441. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2019a. *Mid-year population estimates.* Release number P0202. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2019b. *Consumer Price Index May 2019.* Release number P0141. Pretoria: Statistics South Africa.

Statistics South Africa (Stats SA) 2019c. *Selected building statistics of the private sector as reported by local government institutions.* Release number P5041. 1. Pretoria: Statistics South Africa.

Van Der Berg S 2010. *Current poverty and income distribution in the context of South Africa history*, Stellenbosch Economic Working Papers 22/10. Stellenbosch: Department of Economics and Bureau for Economic Research.

Verbrugge RJ 2012. Do the CPI's adjustments for OER Distort Inflation Measurement. *Journal of Business and Economics Statistics* 30: 143-148.

World Bank 2012. International migrant stock, total. [Online]. https://data.worldbank.org/indicator/SM.POP. TOTL?view=chart. [Accessed 26 September 2018].

7. APPENDIX

Appendix A

Table A.1. Annual household income by population group

Source of income	Black African		Coloured		Indian/Asian		White		Total	
	Average income	%	Average income	%	Average income	%	Average income	%	Average income	%
Income from work	69 094	74,3	131 699	76,2	215 784	79,4	300 498	67,6	100 246	72,6
Income from capital	842	0,9	1 364	0,8	2 173	0,8	16 184	3,6	2 451	1,8
Pensions, social insurance, family allowances	8 921	9,6	12 260	7,1	10 028	3,7	30 739	6,9	11 378	8,2
Income from individuals	2 194	2,4	2 430	1,4	3 309	1,2	5232	1,2	2 542	1,8
Other income	1 261	1,4	2 265	1,3	2 323	0,9	6 520	1,5	1 886	1,4
Imputed rent on owned dwelling	10 671	11,5	22 747	13,2	38 005	14,0	85 271	19,2	19 665	14,2
Total	**92 983**	**100,0**	**172 765**	**100,0**	**271 621**	**100,0**	**444 446**	**100,0**	**138 168**	**100,0**

Table A.2. Households who choose to rent and those who choose to own

	Renters	Owners
Gender of household head – male	-0.081	0.108
Age of household head		
15-20	1.257	-1.116
20-25	1.401	-1.272
25-30	1.304	-1.290
30-35	1.200	-1.155
35-40	0.981	-0.929
40-45	0.731	-0.754
45-49	0.462	-0.537
50-54	0.300	-0.376
55-59	0.094	-0.213
65-69	-0.219	0.256
70-74	-0.272	0.116
75-79	-0.156	0.030
80+	-0.327	0.272
Metro	0.140	-.056
Traditional	-0.803	0.734
Rural	-0.203	-0.449
Children under 18	-0.571	0.530
Income		
R3 500 - R7 500	0.310	0.078
R7 500 - R15 000	0.433	-0.011
Over R15 000	0.352	0.198

Reference group: Female, 60-64, urban, no children under 18, income below R3500